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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.
SECTION H. ANTHROPOLOGY.

SECTION H of the American Association for the Advancement of Science held its regular sessions at the fifty-fourth meeting of the association, which was in progress in Philadelphia, Pa., during convocation week. The American Anthropological Association and the American Folk Lore Society affiliated with Section H.

The officers for the meeting were as follows:

Vice-President—Walter Hough.
Secretary—George H. Pepper.
Member of Council—C. B. Moore.
Sectional Committee—M. H. Saville, vice-president, 1904; George H. Pepper, secretary, 1904; Walter Hough, vice-president, 1905; George H. Pepper, secretary, 1905–'08; F. W. Hodge, W J McGee, Alice C. Fletcher, George Grant MacCurdy, Ales Hrdlicka.
Member of General Committee—B. T. B. Hyde.
Press Secretary—Secretary of Section.
Officers of the American Anthropological Association—President, W. H. Holmes in the absence of W J McGee. Secretary, George Grant MacCurdy.
Officers of the American Folk Lore Society—President, George A. Dorsey in the absence of George Lyman Kittredge. Secretary, W. W. Newell.

The address of the retiring vice-president of Section H, Marshall H. Saville, entitled 'Mexican and Central American Archeology,' was delivered Friday afternoon.

WEDNESDAY, DECEMBER 28.

The afternoon session began with the paper on 'Anthropometric Work at the St. Louis Exposition: (*a*) Sense Tests of Vari-

ous Races, (*b*) Physical Measurements of Philippine Groups,' by R. S. Woodworth and Frank G. Bruner.

Over a thousand individuals, belonging to twenty-two groups and nine races, were measured, and most of these were subjected also to sensory and mental tests. Among the results may be mentioned: the superiority of some groups, especially the Filipino, in eyesight, and the inferiority of others, the Ainu, Negrito and African pigmy; the presence of red-green blindness among Filipinos to about the same extent as among whites; the general inferiority of other races to the white in fineness of color perception, but no special deficiency in perception of the violet end of the spectrum.

A comparison of the height, cephalic, facial and other indices of several Filipino groups was obtained which showed that, on the whole, the population of the islands is remarkably uniform in physical measurements.

After the presentation of Professor Woodworth's paper, the society adjourned to attend the discussion on 'Mutation Theory of Evolution,' in Dental Hall.

THURSDAY, DECEMBER 29.

The meeting was opened by the vice-president, Walter Hough. The first paper was, 'The Story of a Shield,' by James Mooney.

Professor Mooney said in part:

In the old days all men between twenty-five and fifty years of age, in the Kiowa tribe, had shields. They were the personal property of the mounted warriors and, on the plains, this object was the most prized possession of the Indians. When a warrior was killed his shield was usually buried with him. Each shield had a distinct origin, although a number might be made of the same form and from the same dream. Out of 300 Kiowa shields there might have been 50 shield origins. One man might make many shields, which came from a dream, and the wearers would form a small clan-like body. One of the old shields was that of the buffalo. Its origin was from the buffalo and it had buffalo medicine. It was worn by the medicine men who knew how to cure arrow and gun-shot wounds. As shields were used in warfare, they could be made for no other purpose.

The bird shield was of special interest to the speaker, as he had been more closely associated with it than with any other. A story was related of a Kiowa boy who endeavored to get medicine from a water monster formed like a horned alligator. He approached a pool and looked into the water. He heard the voice of a boy who finally invited him to his father's tent. The young man went in. He saw seven men seated against the wall of the tent. These men turned into birds. Each had a shield which was fastened above his head. They told the young man that they had heard his longings and that they would give him medicine. They would give him a shield. They also gave him nine songs. The shrike gave him the song that was to be sung when he went into battle. The call of each bird was to be used in battle in connection with the proper shield and accompanying the song of the particular bird.

A model of the original bird shield was shown. It had a rainbow, the sunlight and dots representing the ashes thrown down by the old men in the sky. These objects were considered to be great medicine. The inside of the shield contained the secret medicine known only to the owner. This was revealed at the moment that the owner made a charge in battle. Each shield had a number of taboos, the breaking of which was a misfortune; there were, however, many ways of propitiation and thereby overcoming the harm that had been done.

Themistology. EDWARD LINDSAY.

An important branch of the study of man is the science of institutions. Of human institutions one of the most important is law. Law has been defined as any restraint of the individual by the group which is backed by physical force. This overlooks the idea of rules for the adjustment between individuals of the rights inhering in them by reason of their status in the social organization, which are the greater part of law. Different terms for these two concepts are needed; the first may be called *Nomos,* the second *Themis.* The science of themistology would investigate that portion of the law of all peoples embraced within the concept *Themis.* Ethnologists have determined that there are various forms of social organization which have existed at different periods and among widely separated groups, and from the study of these have distinguished successive stages in the evolution of society. In the same way we should examine other themal concepts, as marriage in its various forms, contract, etc., and, after collecting all available facts, study them and determine whether there are ideas recurring generally among different groups which pass through a stated course of development. By this use of the scientific method may be obtained a true science of law. This subject is urged on the attention of anthropologists because the facts must be largely collected among primitive peoples. To distinguish between the two different classes of facts included under the term law, however, is essential to an intelligent collecting of material.

Recent Investigations in the Somatic Anthropology of the Brain of Distinguished Persons, of Individuals of Various Races and of Criminals. EDWARD ANTHONY SPITZKA.

A discussion of the doctrine of cerebral localization, of the significance of brain-weight and of surface morphology in their relations to the intellect and to race, and of the question of brain-heredity. Incidentally the alleged relations of brain structure and crime as maintained by Lombroso and his followers were viewed in the light of recent researches. In the report of the author's studies on the brains of notable men (eleven in all) some interesting results concerning the weight of the brain, the 'concept area,' the cerebro-cerebellar ratio and the redundancy of the callosum were presented in detail.

The Physical Resemblance of Twins. EDWARD L. THORNDIKE.

Measurements were taken of thirty-nine pairs of twins, the results showing that there were always striking resemblances. Various tests were made and tabulated, including physical and mental observations.

The Color Sensibility of the Peripheral Retina. J. W. BAIRD. Read by title.

THURSDAY AFTERNOON, DECEMBER 29.

At the meeting with the American Anthropological Association, Professor W. H. Holmes, vice-president of the affiliating association, presided.

Medical Notes on the Southwestern Indians. ALES HRDLICKA.

The results of five trips to the southwest were presented. These expeditions were made possible through the interest of Dr. F. E. Hyde, B. T. B. Hyde and F. E. Hyde, Jr.

The physical work was reviewed and tables presented showing pulse averages, respiration and temperature. The following tribes were visited and representative individuals measured: The Navajos, Lagunas, Zunis, Hopis, Majaves, Papagos, Pimas, Maricopas, Yumas, Yaquis, Apaches, Tarahumaris, Huicholes, Otomis, Tarascans and Aztecs.

A Tale of the Hudson River Mohican Language. J. Dynley Prince. Read by title.

The Settlement and Transfer of Upper Louisiana. Paul Beckwith. Read by title.

The Use of Study of Anthropology in School. Amos W. Farnham. Read by title.

After the reading of the foregoing titles the meeting was turned over to the American Folk-Lore Society, the paper by Will S. Monroe having been placed on their list.

Dr. George A. Dorsey presided at the meeting.

A 'Report of the Committee on Officers' was read by W. W. Newell. The following officers were elected for 1905:

President—Alice C. Fletcher, Washington, D. C.
First Vice-President—Roland B. Dixon, Harvard University.
Second Vice-President—William A. Neilson, Columbia University.
Councilors—Franz Boas, New York; J. W. Fewkes, Washington; James Mooney, Washington; A. N. Tozzer, Harvard University.

Disenchantment by Decapitation. Address of the retiring president, George Lyman Kittredge. Read by W. W. Newell.

Influence of European Contact on Aboriginal Institutions. Alexander F. Chamberlain. Read by title.

The Kiowa Supernatural. James Mooney.

A very instructive paper concerning the interrelation between the known and the unknown. The making of medicine and its importance to the tribe. One case cited of the Ute Indians killing a Kiowa who was a medicine man. They saw by the painted design on his body that he was a great man. They took his medicine and hoped to profit by it. The Kiowas learned later that the house in which it was kept was struck by lightning. The new owners then disposed of the medicine.

Mr. W. W. Newell called attention to the presence of Miss Mary Speers, a lady who had collected negro songs. He asked that she be allowed to sing some of these southern melodies. In preparing these songs she demonstrated the need of studying the tone of the singer as well as the notes of the song. Four selections were rendered.

Superstitions of School Children. Will S. Monroe.

Mr. Monroe has been collecting the superstitions and games of children for several years. One thousand children were questioned concerning good and bad luck. The predominating good luck charm among the girls was a pin; among the boys, a horseshoe. The number of superstitions among the members of both sexes at different ages were noted and tabulated. These consisted of arrival of company superstitions of which there were twenty-three; those concerning the weather, love and marriage, sickness and death, and the number thirteen. He found that the thirteen superstition does not figure to any extent and was not found in children under ten years of age.

The Tale of Three Wishes. William W. Newell.

A negro story of a man who had three wishes. One should have been for salvation. Other wishes are made and he is given to the devil. When he is being carried away he begs the devil to pick a pear for him. He is so insistent that the devil finally climbs the tree to obtain the fruit. One of the wishes that the man had made was to the effect that any one caught stealing his fruit would have to stay in the tree; thus he had the devil in his power. A second time he gets the devil into his purse

in the form of a ten-cent piece. In thus using his wishes the man succeeded in keeping out of hell.

This tale was compared with other wish-stories in which similar details appear.

Influence of the Sun on the People of the Hopi Pueblos. J. WALTER FEWKES.

The epitome of the history of the Pueblos is shown by their ruins.

The earliest forms were on the plains. The second period brought them to the base of the mesas, the third and last to the level tops of the table lands.

The inclination of the house groups on the mesa tops is in two directions—toward the highest point, to obtain the greatest security possible, and on exposures where the maximum sunlight may be obtained. The houses ofttimes form two lines, the direction being northeast and southwest. This peculiarity was first noted by Cosmos Mindeleff. The reason for this uniformity was not estheticism but the position of the sun. This occurs in all of the Hopi Pueblos but two. There are three specific causes for this: (1) the growth of the family, (2) the growth of the house group, (3) the position of the sun.

Among the Pueblos there are only two places where additions to the paternal home can be made, that is on the northeast and southwest of the nucleus or home group. The reason for this is that the additions must not cut off the sun from the house already built. These additions to the home continue as daughters are born and marry.

When a new clan comes to a pueblo it is given a new position which will not conflict with the sun supply of the first group. The growth of these clan houses is a cellular one in which the family is the initial cell. This explains the form of most of the modern pueblos. Some of these are rectangular, which is the form of many of the old ones. This may be explained by the fact that a number of clans participated in the work of building—both in planning and in carrying out the details of construction, in which case the form of the town was probably prearranged. Even in this form of pueblo the terraces and door entrances were usually toward the sun.

The clans have been a great factor in the formation of the house groups. They are responsible for whatever peculiar features may be in evidence in both the ancient and the modern pueblos. The clan problem is a most interesting one. Its solution can be accomplished in no way save by a thorough study of the migrations of each, and its relationship to the pueblo. It is one of the most interesting phases of anthro-geography or psycho-geography in the southwest.

The Work of the University of California. ALFRED L. KROEBER.

A general résumé of the anthropological work done by the university was given. Results of former expeditions were pointed out and the present policy of the department outlined. Work is being carried on in Peru by Dr. Uhle; in California, especially among the Hupa, by Dr. Goddard, and linguistic and general ethnological work in the same state by Dr. Kroeber. These investigations are under the direction of the departmental head, Professor F. W. Putnam.

FRIDAY, DECEMBER 30.

Historic and Prehistoric Ruins of the Southwest. EDGAR L. HEWETT.

Professor Hewett has devoted several years to the study of the remains of the old sedentary tribes of the southwest. He has mapped large groups and presented data to the department of the interior in an endeavor to have certain areas containing ruins set aside as national parks.

His latest work has been the preparation of changes in and amendments to the bills that have been drawn up for the protection of remains on the public domain. This work enabled Professor Hewett to handle the subject in a very comprehensible way.

The groups of ruins were described, the labor expended in each, and what should be done in the way of preserving them for future scientific work. The various bills for the preservation of ruins were explained, and the objectionable features of each pointed out. Reports of the commissioner of the general land office, and a monograph by the speaker were given to members of the section in order that a better comprehension of existing conditions might be obtained.

The Election at Jemez Pueblo. Albert B. Reagan. Read by title.

Prehistoric Surgery: A Neolithic Survival. George Grant MacCurdy.

This paper dealt with a certain type of neolithic surgery having certain points in common with trepanning, and which has been brought to light during the past decade. The type occurs in France over a limited area lying to the north of Paris between the Seine and the Oise. The cicatrice is usually in the shape of a T, the antero-posterior branch following the line of the sagittal suture; and the transverse branch, encountered in the region of the obelion, descending on either side to a point back of the parietal protuberances. In addition to the T-shaped lesion, one skull was marked by two oval perforations, one quite large, and two pits large enough to lodge the tip of the finger. The eight or nine specimens already described are all from prehistoric sepultures known as dolmens. In the opinion of Professor Manouvrier the lesions were produced by cauterization, an opinion which was recently confirmed by the discovery of quotations from ancient texts describing the treatment for melancholia, hypochondria, epilepsy, etc., as prescribed by the surgeons of the Dark Ages. The paper will appear in the *American Anthropologist.*

FRIDAY AFTERNOON, DECEMBER 30.

Mexican and Central American Archeology. Address of Vice-President Saville.

The Bat-eared God of the Zapotecs. H. N. Wardle.

The paper presented a résumé of the knowledge of this god from the pottery urns that have been found and from representations in the old codices.

Officers of Section H for the ensuing year:

Vice-President—George Grant MacCurdy.
Secretary—George H. Pepper.

George H. Pepper,
Secretary.

American Museum of Natural History.

SECTION I, SOCIAL AND ECONOMIC SCIENCE.

Section I is in some respects ideally constituted. It has a smaller body of experts in its membership who plan its programs and work out its policy. The larger number of members represent business experience and practical social effort. It thus combines in its programs the scientific discussion and methods of the expert with the results of well-considered experience in social and economic affairs. This year's program was well supplied with papers representing both phases of interest.

Two joint sessions were held, one with Section D for hearing a paper by Professor A. E. Outerbridge, Jr., on 'Specialization in Manufactures,' and one with the Society for the Promotion of Agricultural Science, to hear the memorial by Professor W. R. Lazenby on the life of the late Major H. E.

Alvord, of the U. S. Department of Agriculture.

The record of attendance of speakers on the published program was one of the best in the history of the section. Out of the twenty-three papers twenty were read in person by the authors. The attendance on the part of the public varied from thirty-five at the first session to seventy-five at the last session. Five different sessions were held, including one afternoon session devoted to the address of the retiring vice-president, Professor Simeon E. Baldwin, New Haven, Conn., on 'The Modern Droit D'Aubaine,' treating of the recent multiplication of succession tax laws, and their application to non-residents, resulting in double taxation.

The following officers were elected:

Vice-President and Chairman.—Professor Irving Fisher, Yale University.

Council—Marcus Benjamin.

Sectional Committee—E. L. Corthell.

General Committee—Henry Farquhar.

The papers presented included the following as reported in abstract:

SESSION ON ECONOMIC QUESTIONS.

The Basis of Economics as an Exact Science. Professor SIMON NEWCOMB, Washington, D. C.

One of the first things to strike us in the effort to apply scientific methods to economics is the absence of nomenclature. We notice, in the first place, that there is no name for the organized system of economic phenomena. Herbert Spencer has used the term 'social organism,' but the objection to that is that it includes more than is necessary. It embraces all phenomena which are social, but there are social phenomena which do not strictly belong to the economic order or which relate so indirectly to it as to be negligible factors in the consideration of economic questions.

Another phase of defective definition may be mentioned. I refer to the fact that there is no name for that portion of wealth which is not capital. Marshall makes use of the inconvenient term of 'wealth of the first order.'

Referring to the economic order as a whole, we notice, to begin with, that it is a unified system, in which the parts are related as means and ends. In economics these terms, means and ends, take the place of the correlated terms cause and effect in the physical order. That is, the relation of means and ends in economics corresponds to the relation of cause and effect in physics. In the economic order capital is means. The problem, then, is to find the relation of capital means to economic ends. We must study from ends to means and from means to ends according as the one or the other inquiry may be necessary to establish the causal relation which is the business of science to ascertain.

Now, as to the method of inquiry. In this procedure we have to distinguish between machinery which is necessary for production and auxiliary means to an end. The machinery necessary for production is, of course, capital in its essential character. The auxiliary means to ends which capital serves to reach is money. But money, important as it is in its auxiliary function, adds nothing to the power of the machine.

Knowledge or direction is needed as another auxiliary in the organization of the means to ends of production.

Socialism overlooks the necessity for the means of production, and seems to be based on the omission of this mediating factor between man's wants and his ends. The socialist is like the man who walks to the edge of a precipice and proposes to proceed even at the risk of losing his life rather than to build a bridge to pass from one precipice to another.

How far can economics be made an ex-

act science? It is often said that this subject depends too much on the vagaries of human nature to bring the economic processes within the category of exactness, This is true to some extent. We all know that the corn and the cotton crops, for instance, are uncertain quantities. We know that these affect economic activities to such an extent as to require constant readjustment. On the other hand, it is true that we know just about how a shortage in the corn crop or a marked enlargement in the cotton crop is going to affect the actions of persons interested. We know how the economic order in general, and how the divisions of enterprises directly affected are going to behave, other things being equal, under the changed conditions in the crop yield. It may, therefore, be said that there is a far greater degree of exactness attainable in measuring the force of economic processess than is usually assumed in the criticism based upon the assumptions of the vagaries of human nature.

We may, therefore, be exact in the investigation of the action of causes. For example, we can study with a remarkable degree of accuracy the influence of the increase of currency upon prices.

We may also make the comparative condition of the masses in different countries a subject of exact study. Take the five different nationalities of Russia, Austria, France, England and the United States. These are given in the order of the wage income, let us assume. The cost of subsistence is about the same in all of them, but wages are lower in the order given. Why is this the case? There must be some exact causes, and the problem is to determine what these laws are.

Another phase of the subject of method on the action of causes appears in the application of mathematical methods or principles to the study of economics. Jevons, for instance, applied mathematical methods to the determination of the law of marginal utility thirty or more years ago, and the principle has been extensively used and developed in numerous treatises since then. The law of supply and demand has likewise been treated mathematically by Marshall.

Returning again to the study of the condition of the masses, the main question is to find the causes of inequality of income. Methods hitherto pursued have generally lacked comprehensiveness. We may, however, assume that these inequalities are determined by the law of supply and demand and by a law of distribution growing out of the law of supply and demand.

One of the first things we notice is the great difference in apparently similar men. The captain of an Atlantic liner, for instance, who has millions of dollars of value intrusted to his care, together with thousands of lives, may in all outward respects and in mental qualities be apparently the equal of one whose judgment and practical capacity could in no wise be intrusted with so responsible a task as that of bringing a vessel across the Atlantic in safety.

The first problem which we may propose for ourselves in this field is that of the effect of supply and demand on the distribution of income. In books three and four of my 'Principles of Political Economy,' published twenty years ago, I sought to work out this problem in its twofold aspects: (1) From the standpoint of the productive process, and (2) from the standpoint of the societary circulation or the monetary movement. The chief difficulty in the solution of this problem lies in the numerous complications of the economic order as represented in changes and the multifarious causes at work. The problem may be simplified in statement by being represented in graphical form. We may, for instance, take the loaf of bread as a product and follow it back

through the chain of incipient factors, beginning with the farm on which the wheat is produced as the first step; second, Chicago as a wheat market; third, the baker; fourth, the house of the consumer. The productive process may be said to terminate, temporarily, at any rate, in the house, extending from the farm of the producer to the house of the consumer. On the contrary, the societary process, or the monetary flow, extends from the house of the consumer back through the baker and through the wheat market to the farm where production began. These two currents represent an exact quantity, in the one case of goods, and in the other case of money. They move in opposing directions, and in this respect are analogous to the two opposing currents acting simultaneously, as represented in electrical theory.

There are various other causal factors to be brought into the study of this relation, including such factors as the mechanic, who purchases from the hardware store, the hardware store purchasing from the tool factory, the tool shop purchasing from the rolling mill, and the rolling mill from the mine; but along each of those connections the two currents, productive and circulatory, are in active operation, and all of these factors are directly or indirectly connected with another factor—the government.

This representation may seem at first glance to be complicated by reason of the numerous currents represented in the twofold process, the productive and the circulatory. Could the conclusions arrived at in this method be put in such a form as to have the community accept them? Economic conclusions are not easily accepted by the community in general. Why is this so? One reason—possibly the main reason—is that economists have failed to distinguish between means and ends. To the economist ends, rather than means, are important all the time. The economist, as a rule, has laid so much emphasis on means as to diffuse the sum total of impression made upon the mind of the community. Nevertheless, the individual member of the community and the community as a whole are interested in results, in ends, in income rather than in outlay, but the income in which they are interested is not the monetary income, but real income. I may illustrate this by supposing that in case of our civil war, the policy of the northern states toward the south had allowed exports to be made unhindered, but had prohibited all imports except gold and silver. What would the effect have been? The great majority of people would at first hand say that it would have enabled the confederate states to command the control of all utilities they desired, and thus worked exactly contrary to the blockading policy. But would that have been the case? We see that it would not, as soon as we realize that gold and silver are means and not ends. If the prohibition of imports of economic goods, except gold and silver, had been carried out, the productive process would have been interrupted and the starving-out policy have gone on substantially as it did under the blockade. This illustrates the relative importance of the productive process as distinguished from the monetary movement.

Workings of the Anthracite Coal Strike Agreement. WM. H. TAYLOR, St. Clair Coal Company, Scranton, Pa.

This strike was inaugurated May 12, 1902. Five months later President Roosevelt appointed the commission "to inquire into, consider and pass upon the questions in controversy in connection with the strike in the anthracite region, and the causes out of which the controversies arose. By the action you recommend, which the

parties in interest have in advance consented to abide by, you will endeavor to establish the relations between the employers and the wage workers in the anthracite field, on a just and permanent basis, and, as far as possible, to do away with any causes for the reoccurrences of such difficulties as those which you have been called upon to settle." Meanwhile the strikers returned to work. Five months later, March 18, 1903, the commission made its report to the president. The report says: "The occasion of the strike of 1902 was the demand of the United Mine Workers of America for an increase in wages, a decrease in time, and the payment for coal by weight wherever practicable; and where not, then paid by car. The cause lies deeper than the occasion, and is to be found in the desire for the recognition by the operators of the miners' union. The great strike of 1900 which resulted in an advance of ten per cent. in the wages paid to all classes of mine workers, did not leave either miners or operators in a satisfied state of mind, for both agree that since the settlement of 1900 there have been increased sensitiveness and irritation in the mining districts as compared with the previous twenty-five years or more."

Every coal mining company finds, as to the discipline, that there is generally a decided change for the worse; which, although it is known to exist, and is shown in many ways, is still difficult to define. Formerly employees seemed to be willing to turn their hand to anything that would further the work of the company, but nowadays if a man is asked to do a little outside of his regular line, he refuses to do it or does it grudgingly, telling the foreman that it is not his job.

The feeling of sensitiveness and irritation to which the commission referred, has not lessened, but, on the contrary, is a smouldering fire, which breaks forth at the least provocation. The effect of this unfavorable attitude on operations is reflected in the following typical results showing decreased efficiency generally.

One company reporting on all its collieries writes: "We find that the labor cost of producing coal during the period from November 1, 1903, to April 30, 1904, was 36.9 per cent. greater than during the same months in 1899 and 1900."

Two other collieries in the Lackawanna region furnish the following statement, showing decreasing efficiency:

TABLE OF COMPARATIVE EARNINGS AND OUTPUT.

Average Items.	Colliery No. 1.		Colliery No. 2.	
	1901.	1904.	1901.	1904.
No. of miners.....	150	193	170	210
Net earnings per miner, eleven months	$838.64	$871.34	$597.13	$673.14
Net earnings per miner, one month	76.24	79.21	54.28	61.19
Daily wages.....	4.17	4.34	2.88	3.38
Tons mined per miner per day..	9.44	7.46	7.29	6.22

In colliery No. 1, the earnings of 1901 taken as a basis, plus the 14.5 per cent. awarded by commission, should be $959.24; earnings per month, $87.50; per day, $4.77, showing a decrease in net efficiency, notwithstanding shorter hours and advanced wages, of 26½ per cent.

In colliery No. 2, earnings of 1901, plus 14.5 per cent., should give $683.71 as net earnings; earnings per month, $62.15; earnings per day, $3.30, showing net decrease of 16.9 per cent. in efficiency.

The Present Status of Railroading in China. Chung Hui Wang, Yale University Law School.

The present method of railroading in China constitutes one of the prime factors in the shaping of the future destiny of that country. While other countries are now lined with networks of railways, we find

that in China the 'iron road' has not yet become a household word. Foreign observers who have but a superficial view of the subject do not hesitate to attribute the cause of this to the superstition, ignorance, prejudice, and what not, of the Chinese people. In my opinion there are two fundamental causes back of this, the one financial and the other political. If we bear in mind that the construction of every mile of railroad costs upwards of $10,000, we can well imagine the financial difficulties with which we are confronted in the construction of a complete system of railroads. Moreover, the heavy indemnities and exactions which have been wrung from us by the foreign powers at different periods since the Opium War of 1841 up to the Boxer uprising of 1900 have almost exhausted our resources, and have consequently increased the difficulties of our problem. Again, railroading is more than a mere economic undertaking; it has political as well as strategic importance. The main objection which has been urged by the high officials against the adoption of railroads is that as long as China is not strong enough to defend herself against foreign aggressions, the presence of railways would be a constant menace to the safety of the country. If we read the Chinese state papers on the subject, we shall notice that the problem has been somewhat overestimated in its political and strategic importance, and underestimated in its economic and commercial aspects.

To Li Hung Chang is usually given the credit for the construction of the first permanent railway in China in connection with the Kiping coal mines, eighty-four miles northeast of Tientsin; but the credit is justly due to a subordinate official, Mr. Tong King Shing, the pioneer of the introduction of modern improvements into China.

After the Chino-Japanese War of 1896, the idea of constructing railroads exclusively with Chinese capital was abandoned as being impracticable, and in March of that year an Imperial Edict was issued encouraging the construction of railroads, and in October, an official of high rank, Sheng Sun Hawai, was appointed Director-General of Railroads with full power to raise foreign loans. This was the beginning of the period of 'concessions.'

Within the past few years 'railroad concessions' covering about 5,000 miles of railway lines have been granted to different syndicates, the largest of which is the Belgian. These 'concessions' provide that the ownership in the railways ultimately reverts to the Chinese government. Concessions are really contracts between the native company of Chinese railways and the foreign syndicates.

Can the South Manufacture Her Own Cotton? CHARLES LEE RAPER, University of North Carolina.

Slavery was a decided hindrance to the highest industrial development, just as the free negro and the free negro's ghost in politics are obstacles to present industrial progress.

The new south is not largely a product of outside energy and capital, but is a revival and continuation of the old life; she is a product of the ability of the southern white man working under new conditions. Though the new south is still far behind the north in wealth and industrial activity, the first twenty years of her life saw more remarkable progress than any other section of this extensive country.

General statistics are not all the evidence that goes to the support of the conviction that this section can become the world center of the manufacture of cotton goods. There is much in the general situation to which statistics can not give adequate expression. Climate, lack of damaging frost,

great water power and its freedom from ice, and the cheapness of housing, clothing and feeding the operatives, are all in favor of this view. The specific facts of cotton manufacture during the last twenty-four years show that in 1880 the southern states had less than 700,000 cotton spindles and about $20,000,000 invested in cotton factories. To-day they have about 8,000,000 spindles, or more than eleven times as many as in 1880. To-day they have almost $200,000,000 invested in factories, or ten times as much as they had twenty-four years ago.

The greatest need of the present is the direct sale of the products of the cotton mill to consuming markets. This is gradually being supplied, and with it the complete chain of economic production—the farmer, the manufacturer, the carrier and the merchant—will be primarily in control of the section of the country which is the source of the raw material.

SESSION ON EDUCATION AND SOCIAL SCIENCE.

Ameliorative, Preventive and Constructive Social Work: and the Ideal Training for Social Workers. Mrs. Anna Garlin Spencer, New York School of Philanthropy.

Social service and social work mean, first, a synthesis of that which is connated in the four basic institutions of society, the home, the school, the church and the state. Social service has in it something of the religious appeal to grow better and stronger, however difficult the growth may be. It has much of charity's special quality of devotion to those whose personal or social condition makes it most hard for them to live a truly human life. It has something of that dependence upon the organized whole of society which has given the modern state its functions of charity, education and public enlightenment through free public benefits. It has much of that spirit of moral reform which is forever blazing out in holy passion of rebuke against tyranny of the weak by the strong. It has, most of all, a giant share of that new impulse in education which demands for each child 'the best development society can afford.'

The supreme distinction of modern social service lies in its fundamental ideals and the conscious purpose in its application of those ideals. Those fundamentals are:

1. A belief in what Horace Mann called the 'infinite improvability of mankind,' a deep faith in the essential good quality of human nature, a faith shared with all new types of religious belief and the root of the new education.

2. A belief that the race is not improved solely or chiefly through its moral and intellectual elite (those capable of becoming saints and sages and leaders), but that the race is to be improved most completely and surely by the upraise of the whole mass of mankind. This is a faith in the spiritual essence of democracy.

3. A belief that here and now society has both the duty and the power to undertake consciously, determinedly, systematically and hopefully this upraise of the whole people, this demonstration in terms of absolute democracy of the worth of all human beings.

4. The belief that in order thus to grow nobler, purer and stronger and happier human beings in this wholesale fashion, society must also work to make a better world for the less fortunate and the weaker human beings now living.

5. The belief that since all the people, especially 'the least of these,' are to be lifted, society must hold itself responsible for the welfare, the safety, the chance to grow, the opportunity for education and the ability to become self-supporting, of every human being.

This then which we call social service is a synthetic appreciation and use of the

new ideals of education, democracy and religion.

This synthetic function divides itself into three main departments of social effort, namely: (1) Ameliorative work, (2) preventive work, (3) constructive work.

In all great social activities the three departments named work together and, therefore, the efficient organization of all charitable and reformatory forces is now indispensable to social advance. The modern warfare against disease is a perfect illustration of the interaction of ameliorative, preventive and constructive social work. At least one third of all the persons who require relief of a charitable nature do so because of illness or physical disability.

Child Labor in Southern Mills. A. J. McKELWAY, Assistant Secretary of the National Child Labor Committee.

The southern cotton mill industry is centered in the Piedmont section of the four cotton states that have mountains, namely, North Carolina, South Carolina, Georgia and Alabama. These are the manufacturing states of the south.

This industry grew up in a night, and old historic communities, holding fast to their *laissez faire* doctrine, found themselves suddenly confronted with the problems for which they had no social experience and no legislative precedents. All of our industries are infant industries. In 1880 there were 667,000 spindles in the southern states. In 1900 there were 7,000,000. In 1900 there were 412 cotton manufacturing establishments. In January, 1904, there were 900, so that this statement of their number is antiquated as soon as it is made. The number has been more than doubled in the last four years. South Carolina stands next to Massachusetts in the number of spindles, and North Carolina is ahead of either in the number of cotton mills, the mills being smaller on the average than those of the other two states mentioned. Considering the shortness of the period of this revival of manufacturing, the south as a whole has acted with commendable promptness in recognizing and seeking to remedy the evils of child labor. The conditions of this industry in the southern states to-day are superior to those in either England or New England and probably superior to those that obtained when the industry was at its best in New England and the operatives were the hardy children of the New England soil. Despite the stories that have been published in the magazines at so much per column, it is a source of gratification to know that people are buying good clothes and good furniture and pictures and books and stoves. The homes of the people are three- and four-roomed cottages, an infinite distance from the one-roomed hut, and every cottage has an acre plat of ground, for the garden, while the pigs and the chickens and the cow have quarters of their own. And there is all of God's out-of-doors for breathing space. There is no night work at the mill, spinning and weaving departments being evenly balanced so that what is spun one day is woven the next. The hours are long, however, from 6 in the morning to 6:30 at night, with an intermission of forty minutes for dinner and a half holiday on Saturday. And this brings up the fact that there are too many young children in that force of a thousand workers and that eleven hours and fifty minutes a day is too long for any child to work in a mill, be the work ever so light.

Work of the National Child Labor Committee. SAMUEL MCCUNE LINDSAY, Secretary, New York City.

The permanent organization of the committee took place at the house of Robert W. de Forest, New York City, November 28,

1904, with a membership of forty-six persons, constituting, perhaps, as remarkable a group of varied industrial, financial, educational and social interests as was ever brought together in America or in any other country. Its membership now represents fourteen states and the District of Columbia. The object is to secure as nearly as practicable uniform legislation and uniform enforcement of laws on this subject throughout the union.

The work before the national committee comprises the education of public opinion, on the one hand, and the bringing to the attention of both the legislative and executive branches of the state and national governments the results of the careful and scientific study of both existing conditions and remedial measures. The national committee hopes to bring together the results of a larger parental responsibility, the better development of the public school system and the enactment of child labor legislation in the several states and territories, and to coordinate these efforts so that the evils of child labor may be eradicated from the industrial system of America.

The Press as an Educator. Wm. H. Lynch, Salem Public School, Salem, Mo.

Jules Verne, the world-famous novelist, wisely predicted that long before the middle of the century novels or romances, in volume form, would be supplanted by newspapers. The newspaper of to-day, great as it is, has yet before it a development and potentiality for usefulness scarcely imagined by its most far-seeing and progressive directors.

It must be obvious to all thoughtful persons that the newspaper may easily be made the medium of imparting valuable instruction in many departments of knowledge on which the very latest text-books are mere blanks. Take, for example, the experiments of Marconi in wireless telegraphy, so minutely recorded and illustrated in almost every newspaper. Would not the study of the despatches, describing the achievements of the great Italian, by boys and girls sufficiently advanced to understand them, be infinitely more profitable than the dull book pages they are compelled to read concerning the laying of the first ocean cables so many years ago? To this question there can be only one answer.

Take another current subject, with the discussion of which the newspapers have been filled in the most instructive and luminous way—that of Venezuela. What might not a competent teacher, with the aid of the press, have accomplished in the treatment of this question toward instilling in the minds of his pupils correct understanding and conception of the Monroe Doctrine, let us say, or a knowledge of the Spanish-American republics generally and our relations to them? Then there was a great coal strike and the war between Russia and Japan.

In the school books are a few meager facts and dates, forgotten almost as soon as they are learned, with respect to that basic factor in the industrial world. With the universal interest centered in the subject and the assistance of the newspaper, the skillful teacher could have done more to expand and inform the minds of all those intrusted to his care than all the text-book writers combined. Children should not, of course, be permitted to read everything printed, even in the newspapers. The latest advances in scientific knowledge, the newest inventions and discoveries, in every branch of human endeavor, are all heralded in the morning or evening despatches. Years hence the text-books will, as it were, embalm them in their solemn pages. Why should the child be compelled to sit in darkness with the light of knowledge blazing all around him?

Ethnic Factors in Education. Dr. EDGAR L. HEWITT, Washington, D. C. To be published in the *American Anthropologist.*

The American Negro. EDWARD L. BLACKSHEAR, Prairie View, Texas.

I. *Some Survivals of Primitive Racial Instincts in the American Negroes.*—The absence or, rather, scarcity of islands and peninsulas and bays and seas along most of the coast line of continental Africa has exerted indirectly a profound influence on African character. As a result, the African tribes have been isolated from all the great historical world movements, and have remained stationary in their social and tribal relations. Deprived of the stimulus of commercial and maritime influences, they have for centuries lain dormant in respect to the higher or organic life of the human species.

Herein lies the secret of the southern racial problem. The real crux of this difficulty is not the mere color of the skin, as is sometimes asserted. It is the sum total of characteristics, mental and moral, of which the exaggerated physique is the material expression and vehicle—it is this that constitutes a race problem when a group of Afro-Americans comes into any sort of relationship for a continued period with an Anglo-Saxon group.

II. *Negroism.*—By this term is meant to be conveyed an idea of a sum total of the characteristics—the mere color of the skin, while the most obvious, being really, as it is literally, superficial—which is the result of centuries of a heredity dominated by a fixity and sameness of environment as barren of differentiating and developing features as the Saharan Desert—a heredity wherein the mere struggle for animal existence and reproduction was the moving force, a heredity whose sameness of environment and want of contact, either friendly or hostile, with different human types, resulted in an exaggeration of qualities, physical, mental and moral. Add to the influences of this unvarying African environment and heredity all the influences of American chattel slavery which served to still further exaggerate tendencies already abnormally developed, and the resultant is what is here designated negroism. The significance of negroism lies in the defective attempt, grotesque to the cultured Anglo-Saxon mind, of the African mind to incorporate into its own thought and being, the real living thought and motives of the Anglo-Saxon race. And herein too lies the gist of the negro question.

The remedy for negroism is the development of Americanism, that is, of intelligent self-respect and a manly regard for others; of self-reliance as manifested in industry and economy and self-support; of a simple, pure, healthy, happy home life as opposed to polygamous indiscriminateness; a regard for peace and good government and good order rather than a scramble for place and power and spoils; a love of country, of home and a love of God manifested in a life of simple sincere piety rather than in manifestations of religious emotionalism unaccompanied or uninspired by the spirit of a genuine Christianity.

On the Desirability of Founding an Institute for the Study of Blood Poisoning. P. A. MAIGNON, Philadelphia.

In these days of immense activity great problems can be settled only by specialization. The prevention of disease is one of these problems. Medical science deals with the cure of disease; sanitary science with its prevention.

Medical and surgical science has been much endowed, but sanitary science has somewhat lagged. Sanitary plumbing and sanitary engineering are about all we hear of in connection with sanitary science.

The writer has for the last thirty years been associated with the sanitarians of London, the hygienists of Paris and in a general way with physicians taking particular interest in the prevention of disease, and it has occurred to him that a good purpose would be served if an institute were founded in this country for the special study of blood poisoning, particularly as regards the first step of infection. The physiological, chemical and physical composition of normal blood is pretty well known, but the immediate phenomena which obtain before the appearance of morbid symptoms do not seem to have been studied to any very considerable degree.

The main object of such an institute for the study of the different phases of blood poisoning, their cycle and variety, should be to find out and indicate the means to prevent the infection in each case.

Sociological Features of the National Irrigation Movement. Guy Elliott Mitchell, Secretary of the National Irrigation Association, Washington.

No question before the public to-day presents more interesting sociological phases than does the national irrigation question in America, not only through the great number of homes to be created by artificially watering desert wastes but through the far-reaching effect of the working out of a great government irrigation policy and the general education of the American people on the advantages of this practise both west and east.

The social side of irrigation can be described in the single clause—irrigation subdivides and resubdivides lands into small home tracts.

Irrigated communities average the smallest farms in the world. The most highly developed portion of the west contains thousands of five and ten-acre farms from which men are making comfortable livings. The social conditions of some of the most intensely irrigated tracts are perhaps the most nearly perfect of those of any communities in the world.

Now the effect of the great government irrigation work, which is being pushed rapidly forward, will be to create a western empire of new homes and at the same time, incidentally, thoroughly to educate the people of the entire country on the subject of irrigation. The consequence will be that irrigation practises will finally enthrall the eastern farmer. The facts as they exist in European countries show that irrigation can be practised with great profit even on land which has sufficient rainfall to grow paying crops. Irrigation is a crop insurer, besides producing double yields, and when it is applied to eastern farm lands the same conditions will result which are found in the arid region—the farms will be divided into smaller and better tilled tracts.

Along with the prosecution of the government irrigation policy and its great agricultural educational features will come the establishment of rural colonies throughout the entire country, home-acres for factory employees, making them to an extent independent of their daily wage, and the gradual trend of the city congestion back to the land as the primal source of all wealth. Working along with this policy of intensive farming and high cultivation is a recognized movement to engraft a practical agricultural education, nature study and handicraft work, upon our common school system so that men and women of coming generations will both want and strive to own a home on a piece of land and when they secure it will know how to make it productive and attractive.

STATISTICAL SESSION.

Beef Prices. Fred C. Croxton, U. S. Bureau of Labor.

An advance in fresh beef affects the expenditure of the working-man's family as much as would the same advance in the price of each of the four items, flour, corn meal, bread and milk. An advance in beef of two cents per pound means (if he buys the same grade and quantity), the expenditure of an additional amount equal to the cost of lighting, or to taxes and property insurance combined, or to the expenditure for books and newspapers.

The retail price of fresh beef at the present time is about ten per cent. above the average for the ten-year period from 1890 to 1899. The value per pound of the fresh beef exported also shows a decided advance. The average value for the last five years was 11.4 per cent. above the value for the preceding five years, and 13.3 per cent. above the value for the five years ending June 30, 1894.

A study of prices during the last fifteen years shows that with few exceptions the prices of beef cattle, of fresh beef at wholesale and of fresh beef at retail advance and decline together, but not to the same extent. The margin between beef at wholesale and at retail is usually rather close. While some parts of each carcass are retailed at two or three times the cost at wholesale, a considerable portion, if sold at all, must be sold for less than was paid at wholesale. In the early part of the present month, a 'top' carcass which cost the retailer seven cents per pound was sold in Washington as follows: 22 per cent. (including trimmings) at three cents or less per pound; 30 per cent. (including trimmings) at six cents or less per pound.

The demand for fresh beef at home has increased, owing to the increase in population, the greater proportion of persons living in cities and towns, and to improved industrial conditions during the past few years. The demand abroad, as shown by our exports for the five years ending June 30, 1904, was 21.7 per cent. greater than for the preceding five years, and 55.6 per cent. greater than for the five years ending June 30, 1894.

The most difficult question encountered in a study of beef prices is that of the supply. The estimates of the Bureau of Statistics of the Department of Agriculture show an increase from 1890 to 1904 of 15.6 per cent. in the number of cattle in the United States, while in the same time population increased about 30 per cent., and the exports of fresh beef increased 72.9 per cent. Deducting the amount of fresh beef exported from the amount sold by wholesale slaughtering and packing establishments, the number of pounds remaining per capita was 40.5 in 1890, 34.1 in 1900 and is estimated at 40 pounds in 1904. These figures do not of course represent consumption, but afford some measure of the relative amount of fresh beef sold in each year.

One of the most important factors in determining the beef supply is the corn crop. The price of corn makes more abrupt changes than does the price of cattle, yet the course of the prices of the two commodities is almost identical.

Above are considered what may be called the natural conditions in the beef industry. It is possible that combinations of packers exist, which would doubtless exert a steadying influence on declining prices; or a combination might be strong enough to control to some extent the prices of cattle bought for slaughtering, or the supply of beef shipped, which would seriously affect the price to the consumer.

Movement of Wood Prices and their Influence on Forest Management. B. E. FERNOW, formerly U. S. Division of Forestry.

Dr. Fernow refuted, by means of statistics presented in the form of diagrams,

the position of one of the noted English statisticians, Mulhall, that wood prices had fallen and would continue to fall, because the supply of timber was practically inexhaustible. The data upon which the English authority based this conclusion were shown to be worthless. The speaker pointed out the difficulties of securing useful data, from which to diagnose the past and predict the future of price movements, and explained that, and why, prices for lumber did not really represent prices for wood or stumpage. From careful compilations of the experiences of European forest administrations it was shown that wood prices had for fifty to seventy years increased at a compound rate of not less than 1.5 per cent. and for the last ten years at a rate of over 2 per cent., being now at least double what they were fifty years ago. Such data as were available for the United States showed the same tendency and about the same rate; and as the knowledge of the condition of timber supplies in the world was growing, wood prices would increase at an accelerated rate 'until that level has been reached which forces reduction of consumption.' The influence of the increase of wood prices on forest treatment was discussed at length, as tending to supplant the rough exploitation which alone appeared profitable at present, by forestry, *i. e.*, care for the reproduction of a new wood crop.

The Present Demands and Economic Uses of Wood. Wm. R. Lazenby, Ohio State University, Columbus, Ohio.

This paper will appear in full in the *Proceedings of the Ohio State Forestry Society.*

The Wheat Situation in the United States. John Cassel Williams, Washington Correspondent, New York *Journal of Commerce.*

Since the season of 1901 there has been a falling off in the production of wheat in this country, while the increase in consumption has gone steadily forward until the point has been reached at which, temporarily, at least, domestic consumption is about equal to the domestic supply and only a small surplus is available for exportation. The final figures of the Department of Agriculture for the wheat crop of 1904 issued by Chief Statistician Hyde put the total yield at 552,399,516 bushels, against 637,822,000 bushels in 1903, and 748,400,000 bushels in 1901. Though in some years there have been considerable quantities of wheat carried over from one season to another in the visible supplies and in the stocks estimated as remaining in the hands of farmers, the exports of wheat and wheat flour have, from year to year, afforded an approximate measure of the excess of production in the United States over the domestic demand.

Owing to the falling off in production and to the increase in domestic consumption, exports of wheat from the United States have temporarily, at least, practically ceased and exports of wheat flour have been greatly reduced in volume.

The American miller, endeavoring to retain his foreign market, is hampered, not only by the shortage of the domestic supply of wheat, but, also, by the inferior quality of a large proportion of that grown during the past season. The evidence submitted to the treasury department by millers who have asked for an allowance of drawback on the exportation of flour made wholly or in part from imported wheat shows that, while in former years an average of four bushels and twenty pounds of wheat have been required to make a barrel of flour, the average quantity of domestic wheat required this year is four bushels and fifty pounds. Complaint

is made that, even if domestic wheat is used to make flour for export, it is extremely difficult to make the quality necessary to keep up the reputation of the established American brands. Across the northern border in Canada there are ample supplies of wheat of good quality, if the American miller could draw upon that supply of his raw material.

The great body of the millers would welcome the absolute repeal of the duty on foreign wheat and there would doubtless be a vigorous demand for this repeal from other elements in the population of the United States if it were generally understood that, for some months past, the price of wheat in Canada has been from fifteen to twenty cents per bushel lower than in the United States, and that the effect of this has been to increase the cost of flour in the United States by from eighty-five cents to one dollar per barrel, thus increasing the cost of living to every customer of wheat flour in the United States.

What is to be the future relation of the domestic supply of wheat in the United States to the domestic demand? The operation of certain tendencies in American agriculture seem to indicate that wheat production in the United States can not be expected to increase in the future at a much greater rate than will be necessary to supply the increasing domestic demand. It is not impossible that the ultimate result of the operation of these tendencies will be to make the United States a permanent importer of wheat under normal conditions.

SESSION ON PROBLEMS OF COMMERCE, ETC.

Present Status of Maritime Enterprise.

WINTHROP L. MARVIN, Secretary of the United States Merchant Marine Commission, Boston, Mass.

While ocean shipping is in a distressed condition in Europe, it is in a desperate condition here. The Merchant Marine Commission has visited within eight months all of the chief ports of this country and it has not found anywhere so much as one new steamship designed for foreign trade in process of construction. It is, therefore, more than temporary depression which afflicts the ocean shipping of the United States. We are face to face, unless something heroic is speedily done, with the final vanishing of an old, historic industry. It will be generally agreed that President Roosevelt sent his urgent appeal to Congress none too soon. The report and recommendations of the Merchant Marine Commission will be laid before the Senate and House next week.* Though they can not be outlined beforehand, of one fact every member of the Congressional Commission is certain, and that is, that without vigorous national aid and encouragement of some kind we shall inevitably lose the last of our deep sea mercantile marine, not only the ships themselves, but the skilled officers and seamen.

The Merchant Marine Commission in its inquiry has found that all the maritime nations of the world protect and encourage their ocean shipping in some way or other. The most conspicuous instance of this practise is Great Britain's recent grant of $13,000,000 to build two new Cunard steamships, which will receive besides an annual subsidy of $1,100,000 for twenty years. Within sixty years Great Britain has expended about $300,000,000 in subsidies to her steam lines through all quarters of the world; and this, with the vigorous discrimination of Lloyds against foreign shipping, has made impregnable the British mastery of the sea, which was first gained by the navigation laws of Cromwell and the victories of Nelson.

* Senate Document, Report No. 2755, 58th Cong., 3d Sess., 70 pp. To be had upon application to Senator Gallinger.

The Merchant Marine Commission has given some attention to the free ship policy. In reply to inquiries addressed to the chief American owners of foreign-built steamships, these companies one and all declare that they would not bring their foreign ships under the American flag if they were given an opportunity, unless Congress by subsidy, bounty or discriminating duty enabled them to meet the higher wages of American officers and seamen. The Merchant Marine Commission, therefore, has been forced to turn to the alternative of direct national aid and encouragement to our merchant shipping. The exact conclusions which it has reached will be revealed when the report and recommendations are presented to Congress.

Unconsidered Phases of Foreign Trade. Harold Bolce, Washington, D. C. To be published elsewhere.

This paper was presented orally and dealt with the inadequacy of efforts on the part of the United States to secure a more favorable commercial position in the Far East, in South America and elsewhere, where the best efforts of rivals were making it more difficult each year for the United States to obtain a footing.

Analogies Between the Evolution of International and of Private Law. Edward Lindsay, Warren, Pa., Academy of Sciences.

As the ethics of a people are in advance of its laws so are the ethics of the individual always in advance of the ethics of the people as a whole. The individual is always in advance of the crowd, the group or the state. We would, therefore, expect to find the laws governing nations in their intercourse with each other in a less developed state than those governing individuals in their relations with each other. Such is in fact the case. A comparison of international law with the growth and progress of private law will afford information as to the stage and development international law has reached and something of what we may expect from its future growth. This comparison was made between:

1. *Treaties and Contracts.*—Treaties are contracts between nations. In international law in respect to treaties the binding force of the engagement is determined more from the formalities of the declaration of the treaty than from the agreement itself. In an earlier stage of private law this was also true of contracts; origin and history of contracts.

2. *War and Trial by Combat; War the Recognized Means of Settling a Dispute.*—In private law at a certain stage was employed the judicial combat which degenerated into the duel and has now become obsolete.

3. *Arbitration and an Action at Law; Arbitration a Rudimentary Judicial Process.*—In private law we have it to-day as a survival in some instances and there is much reason to think that it was a stage in the evolution of law courts and legal proceedings which was passed through by these institutions. International law may be expected to follow the same course of development in general as private law. International legislation, however, probably is inadvisable. Growth of international law best assured by international court to ascertain and declare the law in concrete cases.

The Meaning of Maritime Expansion. John Franklin Crowell, Washington, D. C.

The upshot of it all is that we as a people are in the tropics. Moreover, we are there in all probability to stay. Ten or fifteen years ago a professor of history sneered at the idea of the annexation of Cuba. But

the recent reciprocity treaty put the commercial relations between the two countries on a basis which makes economic annexation inevitable. Furthermore, every leading British possession in the West Indies has for some years been seeking reciprocal trade treaties with the United States, as a means of economic salvation. The fact is that the American tropics find their natural market for raw materials in the United States. We must find enlarged markets in these as yet undeveloped peoples. Step by step both the pressure from within and the course of events from without are drawing us out into relations with transoceanic countries which already make it necessary to look to the maintenance of communication with the different continents by sea.

At last then we are numbered among the great powers which have borne the burden of the world's colonization. We are there primarily because of the inequality in the degree of economic development, comparing tropical communities with our own. The relation of the more highly developed countries of the temperate zone to the comparatively undeveloped peoples of the tropics is one of the greatest of problems arising out of maritime expansion. The experience of most countries has resulted in one form or another of political dependence on the part of the natives; this political dependence with its varied institutions has its basis generally in an economic dependence or rather interdependence. Among these economic relations are invariably lines of communication and commerce by sea between the foreign country and the dependent territories. Great Britain requires control of the Mediterranean by reason of her relations with Egypt, India and Australia. One can not understand the history of modern peoples without taking into account this relation of the white races to the tropical peoples. With all of its dark pages, there are many proofs of the truth that the greed for gain has been subordinated to dictates of humanity, in dealing with these wards of the northern races. The missionary spirit has helped to temper the ferocity of mammon, and sooner or later insisted on the abolition of slavery throughout the entire region of conquest. There has been a moral expansion running parallel with the political and the economic expansion. Development of purchasing power rather than wasteful exploration of the population has come at last to govern tropical policy.

JOHN FRANKLIN CROWELL,
Secretary.

THE SAINT PETERSBURG CONFERENCE ON THE EXPLORATION OF THE ATMOSPHERE.

As some readers of SCIENCE may remember, the International Meteorological Congress which met at Paris in 1896 appointed a committee to further the exploration of the free air, then already in progress in Europe by means of balloons, and at Blue Hill in this country with kites. The committee bears the somewhat ambiguous name: 'International Committee for Scientific Aeronautics,' and has had for its president Professor Hergesell, director of the meteorological service of Alsace-Lorraine. Originally consisting of eight members, it now numbers about fifty, representing eleven European countries and the United States, for, although our national Weather Bureau has not had a representative on the committee, the writer attended the meetings that were held at Strassburg in 1898, at Paris in 1900 and at Berlin in 1902, and has endeavored to advance the objects of the committee in the United States.

The fourth meeting, appointed for last autumn at St. Petersburg, was regarded as of exceptional importance and, according-

ly, the invitations issued by the Imperial Academy of Sciences brought together, from ten countries, seventeen members of the committee besides about sixty other meteorologists and aeronauts, the latter both civil and military. At the head of the local committee of arrangements was General Rykatchef, director of the Central Physical Observatory, and to him the success of the meeting is chiefly due, for, although the war with Japan had reached an acute stage, it was not allowed to alter the scientific and social program. The first session was held in the palace of the Academy of Sciences on August 29 (new style), when the order of business was adopted, and the same afternoon the conference was formally opened by the Grand Duke Constantine Constantinowitch, president of the Academy, who brought the greetings of the Czar. General Rykatchef then explained the arrangements that had been made for the meeting and Professor Hergesell reported on the work that had been accomplished since the committee had met two years before.

The following day the scientific meetings were begun, these being open to members of the conference, and, with the exception of two days devoted to excursions, they continued until September 3. There were sessions both morning and afternoon which were presided over successively by two members of the committee, and the questions considered came under the following heads: Organization of international observations, special investigations, instruments and technical matters, resolutions. As regards the first, it was deemed essential that each country should possess a special organization for the exploration of the atmosphere and that the results should be published regularly. During the past three years the cost of publishing such observations in monthly volumes has amounted to $10,000, and this has been borne entirely by the meteorological service of Alsace-Lorraine. It is now proposed that the various countries participating in the exploration of the atmosphere shall contribute $1,000 or $1,200 annually, receiving in exchange copies of the publication, and this proposition is to be transmitted through diplomatic channels to the countries represented at the conference.

With respect to the international ascensions of kites and balloons which, for several years, have taken place on the first Thursday of each month, it was decided to continue this practise, but, in order to study the successive diurnal changes, there will be, in addition, ascensions on three consecutive days during April and August, 1905, the dates during the latter month including the day of the total solar eclipse, August 30, when an ascent of a manned balloon was promised at Burgos, by the Spanish representative, Colonel Vivez y Vich. It was also decided that the balloons should be despatched in each country at the hour which corresponded to its daily synoptic weather-map. A statement of the number of *ballons-sondes* lost in Europe showed that this did not exceed four per cent. of those liberated. The committee recommended that observations of cloud-drift should be made at the time of each balloon ascension, in order to determine the motion of the upper currents, and in these observations the nomenclature of the clouds ought to correspond exactly with the international classification. For this purpose a new edition of the 'International Cloud Atlas,' which is now out of print, will be issued.

Dr. Assmann, director of the aeronautical observatory of the Prussian Meteorological Institute, described the new observatory to be erected in large grounds, thirty-five miles southeast of Berlin, because at the existing

observatory, in the suburbs of that city, the trailing kite-wires constitute a danger to life and property. The new establishment will be in every respect a model one, where balloon and kite ascensions are to be made several times a day, a motor-boat on a lake permitting the kites to be flown even in calm weather, and, in this way, it is expected that practically continuous meteorological records will be obtained in the free air. As an indication of what had already been done in this respect, Dr. Assmann exhibited a chart, encircling the hall, on which were plotted the isotherms at different heights above Berlin, obtained from the ascensions of kites and captive balloons made daily for more than a year. From them Dr. Berson showed that the wind-direction shifted to the right-hand with increasing altitude. To complete an account of the aeronautical establishments in Germany for atmospheric soundings, Professor Köppen described the kite-station of the Deutsche Seewarte, in Hamburg, where kite-flights are made every day that the wind conditions allow, the observations being published the same day, with those obtained simultaneously above Berlin, in the weather-bulletin issued by the Seewarte. Professor Palazzo, director of the Italian Meteorological Office, recounted what was being done in Italy to explore the free air, including the recent use of *ballons-sondes*, and General Rykatchef explained the development of the aeronautical section of the Constantine Observatory at Pawlowsk, which was later visited by the members of the conference. Here kite-flights are made whenever possible, the observations being immediately published in the synoptic weather-report of the Central Physical Observatory. The committee considered that a balloon and kite-station in the southeast of Europe is desirable and expressed the hope that the Roumanian Meteorological Service would cooperate in the international ascensions, and also that a kite-station might be established at Pola, Austria, thereby filling a gap in the distribution of such stations.

Mr. Rotch stated that from the observations obtained with kites at Blue Hill during cyclones and anti-cyclones the former appeared to be the warmer up to a height of at least two miles. *Per contra,* M. Teisserenc de Bort concluded from his observations with *ballons-sondes* in France that the vertical decrease of temperature in cyclones up to six miles was faster than it was in anti-cyclones. This last speaker gave an account of flying kites from a Danish gunboat in the Baltic in 1903, when the record height for kites of more than 19,000 feet was reached, as mentioned in SCIENCE, Vol. XVIII., pages 113–14, and he also described recent experiments on his own steam-yacht in the Mediterranean. The most interesting communication, however, was by the president of the committee and related to the atmospheric soundings with kites that he had just executed on board the steam-yacht of the Prince of Monaco, while cruising in the Mediterranean and in the vicinity of the Canary Islands. It will be remembered that the present writer proposed a more extensive campaign of this nature at the Berlin Aeronautical Congress, and unsuccessfully applied to the Carnegie Institution for a grant of money to equip a steamship to make a series of kite-soundings through the trade-winds and doldrums. Moreover, in 1902 he endeavored to interest the Prince of Monaco in such a scheme, as his colleague, Professor Hergesell, succeeded in doing two years later, and the results of these soundings, which Professor Hergesell announced at St. Petersburg, eminently justified the cooperation. The northeast trade-wind was seen to diminish

and become more easterly at the height of a quarter of a mile, then falling calm, and even though the kites were lifted by the motion of the vessel to a height of nearly three miles, the southwest anti-trade, which is supposed to form the return-current, was not encountered, though it has been reported at a much lower altitude upon the Peak of Teneriffe. The temperature was found to decrease up to a third of a mile in height, where there was an inversion of temperature persisting throughout a thick stratum and then a rapid decrease with increasing height, these changes being analogous to those prevailing within areas of high barometric pressure over the land. The interesting investigations of Professor Hergesell furnish additional evidence of the importance and feasibility of carrying out soundings of the atmosphere across the equator and into the southeast trade-winds. The employment of kites to obtain meteorological observations on steamers pursuing their regular courses, the practicability of which the writer demonstrated on a voyage across the Atlantic in 1901 (see SCIENCE, Vol. XIV., pages 896–7), was discussed and it was reported that two German steamship lines and a Spanish company had agreed provisionally to allow observations with kites to be made on their steamers. In view of the importance of studying the meteorological conditions high above the oceans, the committee requested the meteorological bureaus of the various countries to propose to their maritime agencies that kites be employed on the mail and other subsidized vessels, the results of these negotiations to be reported at the next conference.

Recording instruments for balloons and kites were discussed in detail, but it was considered inexpedient, at the present time, to recommend the adoption of any special type of instrument, though the committee requested that a description of the instrument employed should accompany all published observations. The errors of aneroid barometers, caused by residual elasticity and by temperature, were said to be less with the Bourdon tubes than with the usual cylindrical vacuum-boxes and, consequently, the former are to be preferred for *ballons-sondes*. Very light instruments of French and German construction were exhibited, in which the barometer was a Bourdon tube and the thermometer either a bimetallic bar, bent in circular form, or a German-silver tube inclosed in a polished one. Professor Hergesell showed his instrument for manned balloons, where the necessary ventilation of the thermometers is supplied by an exhaust fan, placed in the thermometer-tube just mentioned, and driven by a storage-battery and Dr. Shaw, secretary of the London Meteorological Office, presented Mr. Dines's simple meteorograph for kites that costs but twelve dollars. An apparatus was shown by the writer for determining on a moving steamer the velocities of the true and apparent wind—which latter only is utilized in kite-flying—the speed and course of the vessel enabling the triangle of forces to be solved. Most of the other apparatus which was brought before the conference related to the balloons or their accessories. The closing session of the conference was a ceremonious one at which Count de La Vaulx, of Paris, and Dr. Berson, of Berlin, gave accounts of the longest balloon voyage, from Paris to Kief, and the highest ascension, to 35,000 feet, executed by them respectively.

As is usual at these international gatherings, the social entertainments and visits to scientific establishments were the most interesting features. The first of these was an informal reception at the Grand Hotel before the conference opened, fol-

lowed the next evening by a sumptuous banquet at the Army and Navy Club, which was attended by the Grand Dukes Constantine and Peter, as well as by many Russian officers and scientific men of high rank. The Imperial Geographical and Technical Societies held a joint session in honor of their foreign guests, which was followed by a supper. After a morning spent at the Pawlowsk Meteorological Observatory, when a *ballon-sonde* and kites were sent up from the aeronautical grounds, the Military Aeronautical Park was visited in the afternoon and here all the apparatus of the balloon corps could be inspected, including that which its commander, Colonel Kowandko, was about to take to the seat of war in Manchuria. Another day was occupied by an excursion into the Gulf of Finland on a small government cruiser. Notwithstanding a gentle wind, the light hemispherical kites of Mr. Kusnetzof were easily raised by the motion of the vessel and proved very stable. A satisfactory demonstration was given of the writer's apparatus to determine the true and apparent wind on board. Salutes were exchanged with the Baltic fleet off Cronstadt, and this was only the second reminder that the country was at war, for no evidence of it was apparent at St. Petersburg. After the close of the conference there was an excursion to the Peterhof palace, and on the following day some of the guests were taken up in military balloons, but, unfortunately, the chief object of the ascension, a comparison of the different types of meteorological instruments, failed on account of unfavorable weather.

From the foregoing it is evident that the proverbial Russian hospitality was limited only by the brief time available. The strongest impression left by this reunion at St. Petersburg is a realization of the earnest and widespread efforts that are being made to investigate the conditions of the high atmosphere, and it may be confidently predicted that still greater progress will have been achieved before the next international conference is convened at Rome in 1906.

A. LAWRENCE ROTCH.
BLUE HILL METEOROLOGICAL OBSERVATORY,
February, 1905.

SCIENTIFIC BOOKS.

Food Inspection and Analysis: For the Use of Public Analysts, Health Officers, Sanitary Chemists and Food Economists. By ALBERT E. LEACH, B.S., Analyst of the Massachusetts State Board of Health. New York, John Wiley and Sons; London, Chapman and Hall, Ltd. Cloth, 10″ x 6¾″. Pp. xiv + 787; 278 figs.

The foregoing title very well describes this book written by one of America's analysts of longest experience in this field of chemistry. It is not a manual of food technology or of food physiology, even to such extent as the treatise of König and Dietrich. One chapter is, indeed, entitled, 'Food, Its Functions, Proximate Constituents and Nutritive Value,' but it is given almost entirely to general definitions and classifications for the main groups of food constituents.

Neither is it a text-book of organic analysis. Little space is given to the general principles of determination for fundamental constituents or to those of the construction and use of such apparatus as the polariscope and microscope. Other special treatises, such as volume three of Wiley's 'Principles and Practise of Agricultural Analysis,' Blyth on 'Foods' and Leffmann and Beam's small book on 'Food Analysis,' devote more attention to these general subjects. They have, however, been sufficiently developed to guide the amateur to the essentials of operation and to give most helpful suggestion to the trained analyst, with special reference to the particular operations involved in this branch of food analysis.

Food inspection, its principles and the precautions necessary in its conduct are ably, though briefly, discussed. The care of samples with reference to their identification when in-

troduced as exhibits during a trial, might well have received more detailed consideration. For such as are beginning the work of executive management of a food control or the duty of sampling agent, a tabulated list of the quantities of sample needful for the several kinds of analyses would have had much value.

In discussing the methods of repressing food adulteration the author states that publication has proved a sufficient deterrent, when accompanied by prosecution in a few extreme cases. An expression somewhat contrary to this has recently been published by Director Jenkins, of the Connecticut Agricultural Experiment Station, which is the agency for food inspection in that state. Dr. Jenkins notes that publication, which has heretofore been used as the deterrent from adulteration for most foods, is proving less and less effective, and he urges the need for legislation providing for more stringent measures. The experience of the several states in the matter of fertilizer inspection has shown, on the other hand, that publication is entirely sufficient to repress the fraud once widespread in that trade. The buyer of fertilizers watches closely the inspection reports and avoids dealing with firms that conspicuously fail to meet their guaranties. While it is too early to conclude with reference to the effectiveness of publication as a deterrent from fraud in cattle foods, such inspection having been but recently established, the facts now available indicate that this means is as efficient as in case of fertilizers. It is true that both fertilizer and cattle-food laws contain penal clauses, but these are rarely, if ever, invoked. Is the admitted lack of effectiveness in repressing the adulteration of human foods due to the failure of the publications to reach the buying public—usually the housewives—or are we more indifferent respecting the adulteration of that which we ourselves eat than we are of the food intended for our cattle and our plants?

The chief aim of the book has been to aid the analyst in the detection of food adulterations. For this purpose he must not only know how to detect the presence of foreign substances, but also to interpret departures of the common constituents from their normal proportions. Referring first to the latter requisite: While certain staple foods, such as bread, meat, milk and fruit are used by all civilized countries, the latter differ much in their choice of foods of secondary importance and in their methods of food preparation. America has her own strains of dairy cows, her own varieties of fruit and grain. She buys her imported foods in certain markets rather than in others. Her methods of food manufacture differ at many points from those adopted in other lands. For this reason, the American analyst is unable to rely with full confidence upon the bases of comparison established in German, French or even British experience, and has turned actively to the study of American foods.

Wiley and his assistants began this study years ago, and Leffmann and Beam have ably condensed and supplemented their results in the little manual, 'Food Analysis.' The past decade has witnessed great activity in this field. The Bureau of Chemistry has added much of value to its earlier work; the human nutrition investigations of the Office of Experiment Stations has contributed numerous analyses of American market products; the several agricultural experiment stations have richly increased the literature respecting milk, grains, fruits and other raw materials; and the food inspection laboratories have not confined themselves to the routine examination of food samples, but have studied carefully many of our most important food products. To its general methods of determination for the major groups of food constituents the Association of Official Agricultural Chemists has added provisional methods for the use of food inspection laboratories, and is engaged upon the formidable task of thoroughly testing them prior to their full adoption as 'official methods.' It began, a few years since, the formulation of a series of food standards for the United States. The latter work thus inaugurated, Congress has recognized and placed upon a formally official basis.

The mass of information thus gathered in American laboratories, together with the more recent developments in European food inspec-

tion, scattered through numerous books, official publications and scientific periodicals, the author has ably systematized and condensed. Few American contributions of importance seem to have escaped his notice. Nearly two hundred carefully compiled tables of composition are given, and upward of fifty tables showing the physical characters, chemical constants, etc., of food constituents, are introduced. No important class of foods has failed to receive careful consideration. In this respect, this book is better balanced than any other in this field with which the writer is familiar.

As a guide to special analytical methods the work is no less valuable. It is not an indiscriminate collection of proposed methods. Those presented have been carefully chosen, often as the result of use by the author and with notes and modifications proceeding from his experience.

The microscope as an essential instrument in food analysis is discussed with especial reference to such use, and numerous cuts portraying the histological characters of plant tissues are given, together with a fine collection of half-tones from photo-micrographs prepared by the author. The uses of the newly invented immersion refractometer are especially discussed.

Every laboratory should be planned and equipped with reference to the purposes for which it is to be used. The chapter devoted to the construction and outfitting of a food inspection laboratory contains many ingenious and helpful suggestions. The appliances for the utilization of electricity as a source of heat and power are particularly noteworthy. Throughout the book appear numerous clearly drawn cuts of apparatus, to the number of nearly one hundred. With reference to laboratory equipment, a very useful feature of the book is a list of the needed reagents, with directions for their preparation and tables of their chemical equivalents.

The worker in the field of food chemistry will find of great value the list of bibliographic references with which each chapter closes. In these lists appear not only the most important references given in the 'Vereinbarungen zur Untersuchung von Nahrungs- und Genussmitteln' (Berlin, 1897), compiled by a commission of German food chemists at the instance of the German Imperial Bureau of Health, but many other European references; and a very full series relating to American food literature has been added.

In literary style, the book is clear and concise. The publishers have given it an attractive typography and have illustrated it liberally and well.

To prepare so comprehensive a work without fault in detail of statement or in the selection of material would probably be impossible. Some of the criticisms that are suggested by a careful preliminary examination may be given as illustrative: In referring to 'official methods,' they are not always given in full; one of several alternate methods is occasionally described as 'official' without indication of the fact that there are alternative methods of equal official status; modifications of official methods are sometimes presented without the nature of the modification being clearly stated. Such modifications are usually of a minor character, but not always. The analyst desiring to follow the official method in all its details must, therefore, refer to the bulletins in which those methods are officially set forth.

There are a few striking omissions: No description is given, among the general methods of food analysis, of Stutzer's method for the determination of albuminoid nitrogen. No allusion is made to the methods of quantitative microscopy, nor to the use of clystering phenomena as aids to the identification of starches in mixtures. For the computation of pentosans, the older factors are given, instead of Kröber's revised factors, now generally adopted by specialists in the field of carbohydrate chemistry.

While the cuts as a whole are admirable, those for the several cereal grains, after Villiers and Collin, do not at all clearly represent the distinctive differences between the several species as respects the hairs and bran coats, tissues of especial value in distinguishing these grains when mixed. Some of the microphotographs are too poorly defined to be useful.

All considered, however, this book is the best manual on its special subject in the English language, possibly in any language. It is certain to take its place upon the reference shelves of every American food laboratory.

Wm. Frear.

State College, Pa.

Psychology. By James Rowland Angell. New York, Henry Holt and Co. 1904. Pp. vii + 402.

No one, perhaps, is better fitted to unite in a text-book the standard 'general' psychology which James' 'Principles' represents and the results of recent experimental studies, than the author of this book. The addition of comments from the so-called 'functional' point of view will also be welcomed by the majority of qualified teachers of psychology. We feel the gratitude and satisfaction which are due to a thoroughly capable thinker who gives us a solid, careful and, so far as is desirable in a text for students, original book.

There is no need to note in detail the many excellent features in content and form or the few cases of questionable facts and methods of presentation. Every reader of this journal who is interested in the teaching of psychology should read the book itself. I choose, therefore, to comment on more general issues which it suggests.

Is it wise to divorce the experimental method from the facts of general psychology? Professor Angell's book, like other recent books for beginners, gives no sign that the student is to make any observations systematically or under the conditions of an experiment. It encourages the student to rely on reflection alone—or still worse, on mere memorizing.

Again, is it wise to follow Royce and Stout in choosing the style of the man expressing his own processes of reflection and argument rather than the crisp and objective, if somewhat bald, style of the text-book in physical science? The words *we, us* and *our* occur in this book apparently over three thousand times. A bald fact like 'If sense organs are stimulated, *objects,* rather than mere qualities, are felt,' appears as, "When our attention is called to the fact, we readily notice, as was intimated earlier in the chapter, that if our sense organs are stimulated, we are commonly made conscious of *objects,* rather than of mere *qualities,* such as we have been describing in this chapter" (p. 118).

Does the so-called 'functional' point of view possess any messages of actual fact for the student other than these: (1) That mental life involves not only the existence of thoughts and feelings, but also their connections among themselves and with physical events, and (2) that mental states and their connections have been subject to natural selection? The reviewer is probably wrong, but he finds many of the comments of Professor Angell and others strangely like pure teleology or mere verbalisms. At times they seem even to attempt to explain the origin of variations (at best a ticklish business) by some inner necessity that a need should create its own satisfaction. Are such statements as the following empirical science and, even if they are, will they develop a scientific attitude in students? "Straightway appears consciousness with its accompanying cortical activities, taking note of the nature of the stimulus and of the various kinds of muscular response which it called forth" (p. 51). "Consciousness appears in response to the needs of an organism * * * consciousness brings order out of this threatened chaos" (p. 52). "The organism contains within itself certain *ends* to be attained in course of development by adjustive activities. In part these ends exist imbedded in the physiological mechanisms, where they come to light as reflex, automatic and instinctive acts, sometimes accompanied by consciousness; and in part they exist as conscious purposes, in which case they appear as recognized intentions" (pp. 75–76). "Left to itself, any mental condition would convert itself at once into some kind of muscular movement" (p. 310). "We have already noted its [emotion's] appearance under conditions of stress and tension requiring new conscious coordinations in order to permit progress, and we have connected this fact with the service of emotion as a general monitor re-

porting friction and the need of additional intelligent supervision" (p. 327).

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SCIENTIFIC JOURNALS AND ARTICLES.

The American Naturalist for January contains the following articles: 'The Habits of the Striped Meadow Cricket (*Œcanthus fasciatus* Fitch),' Joseph L. Hancock; 'The Embryo of the Angiosperms,' Harold L. Lyon; 'Notes on the Commensals found in the Tubes of *Chætopterus pergamentaceus*,' H. E. Enders; 'On the Larva and Spat of the Canadian Oyster,' Joseph Stafford; 'A Table to Facilitate the Determination of the Mexican Scale Insects of the Genus *Aspidiotus* (Sens. latiss),' T. D. A. Cockerell, besides reviews and notes.

The Popular Science Monthly for March has papers on 'The Bermuda Islands and the Bermuda Biological Station for Research,' Edward L. Mark; 'A Study of the Development of Geometric Methods,' Gaston Darboux; 'Some Present Problems of Technical Chemistry,' W. H. Walker; 'Stamina,' A. N. Bell (dealing with the prevention of tuberculosis); 'The Natural History of Adolescence,' Joseph Jastrow; 'Higher Education of Women and Race Suicide,' A. Lapthorn Smith; and 'Simple Bacteriology for Public Schools,' Lillian Chapin. There are also shorter articles, including one, illustrated, on 'The Inland White Bear,' by W. J. Holland, and another on 'The Carnegie Institution.'

The Museums Journal of Great Britain has a most excellent paper, with valuable discussion appended, on 'Museums and Nature Study,' by Frank Woolnough. The question of lectures by the curators is touched upon and the suggestion made that the nature teaching may best be restricted to the life and geology of its immediate locality. S. L. Moseley tells 'How we made the Keighley Museum Popular,' and in the discussion special stress was laid upon the educational value of museums and the many things a curator is called upon to do. As Dr. Haddon said, 'the curating of a museum is hard work,' the more that like an iceberg it was seven eighths below the surface and none but those who knew realized the extent of the unseen seven eighths. The balance of the number is filled with reviews and notes.

THE contents of *The Journal of Infectious Diseases* for March are as follows:

HARBITZ, FRANCIS: 'Studies in the Frequency, Localization, and Modes of Dissemination of Tuberculosis, with Special Reference to its Occurrence in the Lymph Nodes and During Childhood.'

HEKTOEN, LUDVIG: 'Experimental Measles.'

NOVY, FREDERICK G., and MACNEAL, WARD J.: 'On the Trypanosomes of Birds.' (With Plates 1–11.)

WHERRY, WILLIAM B.: 'Some Observations on the Biology of the Cholera Spirillum.'

MUSGRAVE, W. E., and CLEGG, MOSES T.: 'Amebas: Their Cultivation and Etiological Significance.' (With Plate 12.)

MCCLINTOCK, T. C., BOXMEYER, CHARLES H., SIFFER, J. J.: 'Studies on Hog Cholera.'

THE London *Times* has established an engineering supplement to be issued weekly. The first number, which appeared on March 1, contains articles on 'British Engineering,' by Sir Charles McLaren; 'Submarines,' by Sir William White; 'The Motor Omnibus,' by C. W. B. Little, and numerous other articles and notes.

SOCIETIES AND ACADEMIES.

THE NEW YORK ACADEMY OF SCIENCES.

SECTION OF ANTHROPOLOGY AND PSYCHOLOGY.

THE section met in conjunction with the New York Section of the American Psychological Association on January 30, afternoon and evening. Professor Woodbridge presided. The following papers were presented:

Color Preferences: R. S. WOODWORTH and FRANK G. BRUNER.

Tests of different races, made at the St. Louis Exposition, showed that red was the color most often preferred, both by men and by women, and by all the races tested. The predominance of red choices was very great. Now previous authors have found, in the white race, that red was a woman's choice, but blue that of most men; this difference of result, as between the present and previous authors, is

probably due to the different material used for presenting the colors—colored papers having previously been employed, whereas in the present tests use was made of colored worsteds, such as are used in the Holmgren test for color blindness. Special tests showed that the same individual is very likely to express a different preference, according as the colors are presented in paper, worsted, or glass. Many persons were also found to dislike strongly the colors of the rose, the violet, and the sunset, when presented in paper or worsted. The inference is that the 'color-tone' is by no means a compelling factor in determining likes and dislikes of colored objects.

The Relation of Intensity of Sensation to Attention: M. Tsukahara.

In an experimental study of the effects of distraction on the apparent intensity of a stimulus, a new method of distraction was employed. Two sorts of stimulus—the sound of a falling ball and the impact on the skin of a falling hammer—were employed, and sometimes presented simultaneously, so that the attention had to be divided between them. For instance, first a sound was given; next, simultaneously, a sound and an impact; and last an impact alone. The subject was required to compare the intensities of the two sounds and also of the two impacts. The result was that, contrary to the conclusion of Münsterberg, distraction *decreased* the apparent intensity of the stimuli; but this result is so far merely provisional.

Ideas and Temperaments: Dickinson S. Miller.

In the psychology of intellectual bias one may study the individual or type in its relation to a variety of ideas, or the idea in relation to a variety of individuals or types. Attempting the latter with the so-called 'ideas of the French Revolution,' liberty, fraternity, equality, reason, the natural goodness of man, and the rights of impulse, spontaneously advocated in literature, we find that different phases of these ideas must first be distinguished. As regards the ideas in these phases, the sympathy or antipathy of authors is found to depend in a determinate manner on the temperamental type.

Organic Levels in the Evolution of the Nervous System: Robert MacDougall.

The relation of organization to discriminative reaction may be stated in terms of four types, the non-nervous, the ringed nervous, the segmented and the cephalic. The types were described.

Number Habit: Robert MacDougall.

By number habit is meant the distribution of frequency in the recurrence of each of the digits when the choice is determined by mental constitution rather than objective evidence. Previous reports have given two types, a curve (Minot's) in which the changes from figure to figure are slight, presenting a high plateau in the middle of the series with a depression toward either end; and a curve (Dresslar's and Sanford's) in which maxima systematically appear in the odd numbers and minima in the even. From an apparently similar series of guesses in the present case a curve was obtained presenting three different levels. Zero and five formed maxima in relation to which all the other digits fell in a low plateau, and of the rest the even numbers formed maxima and the odd minima throughout.

The Relational Theory of Consciousness: W. P. Montague.

The new movement in favor of a relational theory of consciousness is to be welcomed in the interest of a scientific psychology. It is however seriously hampered by a failure on the part of most of its advocates to realize the incompatibility of any form of idealism with the view that consciousness is a relation between its objects, and not something in which they inhere. Things must be before they can be related, hence if consciousness is a relation no object can depend for its existence upon the fact that it is perceived. In short the realistic theory of the world is a necessary implication of the relational theory of consciousness; while, conversely, if we follow common sense in admitting the objective reality of both primary and secondary qualities, there will be no temptation to treat consciousness

as anything other than special relation between an organism and its environment. Realism and the relational view of consciousness are strictly correlative. They are different aspects of the same truth, and can not be defended or understood apart from one another.

Radical Empiricism and Wundt's Philosophy: CHARLES H. JUDD.

Wundt's Critical Realism is closely related in its fundamental positions to James's recent philosophical discussions. Reality and immediate experience are made synonymous by Wundt. The concept of consciousness is not like the concept matter of the physical sciences, but includes only the immediate processes of experience in their totality. On the basis of these closely related fundamentals Wundt develops the details of his system in such a way as to emphasize the distinctions between physical and psychical phenomena while James strives to minimize these distinctions.

R. S. WOODWORTH,
Secretary.

THE TORREY BOTANICAL CLUB.

MINUTES of a meeting held February 14, 1905, at the American Museum of Natural History.

The first paper, which was illustrated by lantern slides, was by George H. Shull and was entitled 'Stages in the Development of *Sium cicutiæfolium*.' Dr. Shull presented briefly the great range of leaf-form in this species at different stages of growth, concluding that these various stages give no safe indication of ancestral forms.

The life cycle of *Sium* fits it for the conditions under which it grows at different stages of its growth, it being mesophytic, hydrophytic and xerophytic in turn. This cycle of changes seems to be independent of external conditions and proceeds regularly without regard for the environment. The consideration of a number of rejuvenated buds shows that rejuvenescence may be brought about by submerging senescent buds in water, and that the later the stage of senescence the earlier will be the juvenile forms which are induced to appear. Evidences were presented tending to prove that the proximal leaflets of pinnate leaves are homologous in any series of leaves taken from the same plant and that the other leaflets are likewise homologous, counting from the proximal pair.

The paper was the subject of considerable discussion.

The second paper was by Tracy E. Hazen, on 'Recent Advances in the Phylogeny of the Green Algæ.' The subject was introduced by a sketch of Borzi's group Confervales, now enlarged into the class Heterokontæ, comprising genera showing natural affinities, taken from the three old orders Protococcales, Confervales and Siphoneæ. This new class, accepted by all recent investigators, serves to indicate the artificiality of the traditional classification.

The clearer lines of descent of the chief groups of Chlorophyceæ from the unicellular, motile *Chlamydomonas* were traced; the first tendency in the direction of aggregations of motile cells finding its highest expression in *Volvox;* the second tendency, in the direction of septate cell division, to form non-motile bodies of increasing solidarity, leading through the Tetrasporaceæ to the Ulvaceæ, which have been placed in a separate order, Ulvales, by some recent authors, and finally, through such forms as *Stichococcus,* to the typical filamentous and branched forms culminating in *Coleochæte.* The third or *Endosphærine* tendency from *Chlamydomonas* as suggested by Blackman, was held by the speaker to furnish an unsatisfactory origin for the Siphoneæ, inasmuch as the endophytic forms associated with *Endosphæra* may be regarded as too specialized in their mode of life at least. It is much more natural to derive the Siphoneæ from the septate, multinucleate Cladophoraceæ. The latter group may well be regarded as an intermediate order, easily derived from the Ulotrichaceæ through such forms as *Hormiscia (Urospora)* and *Rhizoclonium.*

The recent proposition of Bohlin and Blackman to regard the Œdogoniaceæ as forming a class derived from a separate unicellular ancestor is at least premature, and it does not appear at all impossible that this group may have been derived from a *Ulothrix*-like form

as suggested by Oltmanns. The Conjugatæ furnish a perplexing problem, but the speaker preferred to regard this group as forming an order of Chlorophyceæ rather than as a separate class, in view of present evidence.

Edward W. Berry,
Secretary.

THE SCIENCE CLUB OF THE UNIVERSITY OF WISCONSIN.

The fifth meeting of the club for the year 1904–5 was held in the large auditorium of University Hall, on February 23, at 7:30 P.M. The paper of the evening, by Dr. U. S. Grant, of Northwestern University, dealt with the subject 'The Lead and Zinc Mines of Southwestern Wisconsin.' Dr. Grant presented the main results of a careful survey of this region, which during late years has again become an important factor in the domestic lead and zinc production. The work was done under the direction of the Wisconsin Geological and Natural History Survey and a full account of the results obtained will be given in the near future in a bulletin published by the survey. The paper was discussed by various members of the university faculty and others, after which a business meeting of the club was held.

F. W. Woll,
Secretary.

DISCUSSION AND CORRESPONDENCE.

BLUNDERS IN THE SCIENTIFIC RECORDS.

The systematic zoologist and zoogeographer of to-day who is trying to utilize for generalizations the facts which have been accumulated by previous generations is constantly baffled—and often led astray by the insufficiency of the material gathered, the lack of detail and accuracy in the labeling, and the often downright erroneousness in the recording. The last is particularly vexatious, because once put into print, it is almost impossible to eradicate such errors. The everlasting recurrence in zoogeographical text-books of the allusion to the toad once falsely stated to have come from the Hawaiian Islands, and to the two-handed lizard alleged to inhabit Colorado, are familiar examples of these undying errors.

A rather flagrant case of erroneous locality record was exposed some time ago. In 1881 Dr. Victor-Lopez Seoane startled the zoological world by describing a boid snake from the Philippine Islands. It was stated to have been collected by his brother at Manila, and to say that the case puzzled the zoographers is to put it mildly. It was soon discovered that it belonged to a West Indian genus, *Epicrates*, and in my 'Herpetology of Porto Rico' (1904) I showed conclusively that the snake must have come from Porto Rico, being identical with *E. inornatus* which is peculiar to that island. Dr. Seoane's brother is a Spanish naval officer, a general in the marine corps, and this circumstance explains the mixing up of the Philippine and the Porto Rican localities.

A parallel to this blunder has just come under my notice. In 1890 Dr. Seoane again described (in the *Mémoires de la Société Zoologique de France*, III., p. 260, pl. vi) a new species from the Philippine Islands, collected by the same brother. This time it was a toad which received its name, *Bufo panayanus*, from the island of Panay, the alleged type locality being Iloilo. He correctly compared it with *B. gutturosus* from Santo Domingo, but failed to profit by this resemblance to the West Indian species, of which he regarded it as the 'oriental pendant.' While recently completing a list of Philippine batrachians and, therefore, looking up the original records, I was struck by the similarity of Seoane's figures to the Porto Rican toad *Bufo lemur* and a comparison with specimens of the latter easily demonstrated their identity. The relationship to *Bufo gutturosus* from Haiti, which is quite close, is thus easily accounted for, and the 'oriental pendant' done away with. *Bufo panayanus* finds a final resting place in the synonymy of *Bufo lemur*, and the list of Philippine batrachians is one species poorer!

Leonhard Stejneger.
U. S. National Museum,
Washington, D. C.,
March 6, 1905.

THE METRIC FALLACY.

TO THE EDITOR OF SCIENCE: Evidently Mr. Samuel S. Dale, in the issue of SCIENCE of March 3, 1905, under the above title, failed to recognize his own mathematical proof of the amount of saving in time that might accrue in school with the use of the decimal system.

His error probably arose through the use of an artificial week by the board of education merely for their own convenience in assigning the proportion of time in school for each study. The time a child actually spends in school is a small part of the year and it would be a confusion of units to compare this schedule week with a regular week because the same word is used.

The only way a comparison can rightly be made is to take Mr. Dale's statement of what the schedule week is in years—that is, for elementary mathematics thirty-four and one eighth schedule weeks require eight years' work. On this basis 6.825 schedule weeks will require one and three fifth years' work in mathematics.

It is, however, not necessary to introduce this schedule week. The pupil actually spends eight years, according to Mr. Dale, on the text-books mentioned. As arithmetic during all this time is a major study, it is taught to the full capacity of the average child. Now if twenty per cent. of this time, as is allowed by Mr. Dale, is spent on tables of weights and measures, evidently these will require all the time available for mathematics during 1.6 years.

It is probable that a child could easily learn the decimal system in less than half the time it takes to learn both the decimal system and the several other unconnected tables. Accepting Mr. Dale's own figures, it seems, therefore, reasonable to suppose that the average pupil would save from two thirds of a year to one year of the one and three fifth years, now required, and would be about a year ahead in mathematics at the end of the eight years if he had only the decimal system to learn.

I do not desire to enter upon any discussion as to the merits of the metric system, but simply to point out the mathematical error in Mr. Dale's reasoning and to show that if his argument was worth anything at all, it really proved the very statement he was trying to refute.

HENRY B. HEDRICK.
U. S. NAVAL OBSERVATORY,
WASHINGTON, D. C.,
March 9, 1905.

A REQUEST FOR MATERIAL.

I HAVE been at work for some time upon the problem of double monsters among animals and would be grateful for any material coming under this head. I wish instances of genuine double monsters, *i. e.*, those involving the doubling of some axial part of any vertebrate, embryonic or adult (naturally, not too large specimens), and am just now especially desirous of cases among birds. As this is the time of year at which embryological laboratories run their incubators, it seems likely that several such instances will be found by those not especially interested in the subject and who do not care to investigate them. If any such material appears superfluous I will try to make good use of it.

HARRIS HAWTHORNE WILDER.
SMITH COLLEGE,
NORTHAMPTON, MASS.

SPECIAL ARTICLES.

ELLIPTICAL HUMAN ERYTHROCYTES. (A SUPPLEMENTARY STATEMENT.)

ON March 18, 1904, I published in SCIENCE a note describing an unusual variation in the shape of human erythrocytes. As was stated in that article, the blood of a student at the Ohio State University contained elliptical red corpuscles, whose average length was 10.3 microns and whose average width was 4.1 microns. About 90 per cent. were thus deformed. The observation attracted considerable attention, Professor Austin Flint being one among several who wrote to me for a specimen of the blood. There resulted some correspondence between Professor Flint and myself, and in a letter to him I remarked that some time after my observations had been made the young man having these elliptical corpuscles had died. Since the claim had been made that the young man (a mulatto)

was healthy when these corpuscles were discovered, the statement about his death naturally aroused some suspicion. Professor Flint wrote a note in SCIENCE, May 20, 1904, discussing the matter of form changes in the erythrocytes, and pointing out that in progressive pernicious anemia, and other blood diseases, the variations in form and size are well-known facts. He adds: 'In view of these facts, it seems impossible to accept the proposition that the subject of the observation was a *healthy* mulatto.'

It has been my intention to supply the information about the death of the subject of this observation, but for various reasons it has not been possible to do this with certainty until the present time. I am now able to state that the cause of death was cardiac failure subsequent to an attack of acute inflammatory rheumatism. As is often the case, the attack was preceded by tonsilitis, which began about three months after my observation had been made. Consequently, there was no connection between the condition of the corpuscles and the cause of death.

I wish to add some further points to substantiate my claim that the subject of the observation was healthy at the time the corpuscles were described. In the first place, his general physical condition indicated it. He was able to make his living by manual labor, and was studying hard to maintain his standing in his classes. He complained of no illness. As to his blood, it is to be noted that I said that the number of red and white corpuscles was normal, and that the quantity of hæmoglobin was normal. There were no normoblasts nor megaloblasts. On the other hand, when the corpuscles were observed in the fresh state, the uniformity of the elliptical shape was the remarkable feature. The poikilocytosis, to which Professor Flint refers, was much more prominent in the dried specimens. Now it is a well-known fact that there are no cells more susceptible to influences than the blood corpuscles, and, therefore, the poikilocytosis shown in my dried specimens can not be given much weight.

Speaking further about the form variation of red corpuscles, I would say that it is a question about which opinions differ considerably. However, it is not my intention to discuss that point further than to make a few statements bearing upon this particular case. Professor Flint quotes from Ewing's 'Pathology of the Blood,' p. 256, as follows: 'Some times in non-infectious purpura hemorrhagica the red corpuscles are undersized and many are oval.'

I may say in this connection that Professor Ewing saw a specimen of this blood of which I write, and he was of the opinion that the anomaly was one of congenital or developmental origin. He based his view in the first place upon the fact that the number of corpuscles and quantity of hæmoglobin were normal, and in the second place upon the general condition of the individual himself. The subject certainly did not have purpura. And further, I may add that while in Germany recently I had an opportunity to show the same specimen to several men, among them being Ehrlich. The opinions of these men differed somewhat, but in only one instance did doubt arise as to the health of the subject. With this one exception (and the man was not a pathologist, by the way), the specimen did not suggest pernicious anemia nor purpura. Dr. Arneth, in Würzburg, a man who has made several thousand blood slides from a great variety of clinical cases, had not seen such a specimen. One pathologist of considerable reputation thought that the shape was an artifact. He was doubtless influenced by the work of Weidenreich, who claims that the mammalian erythrocyte is not normally biconcave, but bell-shaped. Weidenreich attributes the biconcavity to the corpuscle's extreme 'Empfindlichkeit,' by virtue of which, with slight increase in the density of the plasma or other fluid, the biconcavity arises by loss of water from the corpuscles.* If his work be confirmed by later investigations it would have an important bearing, not only upon this variation which I report, but upon all clinical observations of form changes in the red cells. I do not think that the variation I have described was an artifact, however, and my

* Weidenreich, *Arch. f. Mik. Anat. u. Entwick.*, 1903, p. 459.

opinion is strengthened by that of Ehrlich, who, on the ground of the uniformity of the elliptical shape, concluded that it had been preformed in the individual. As to the cause of the anomaly, Ehrlich did not commit himself. In conclusion, I wish to state the following views about the case:

1. The variation recorded occurred in a healthy individual. His good general physical condition, the normal number of red and white cells, the normal quantity of hæmoglobin, and the absence of megaloblasts, megalocytes and normoblasts, preclude the idea of any known blood disease being connected with the phenomenon.

2. The anomaly was probably one of congenital or developmental origin. Ewing holds this view for reasons stated above. It is unfortunate that no family history could be obtained to throw light upon this point, except that a brother of the subject had normal corpuscles.

3. In the light of Weidenreich's work, it is possible that the elliptical shape was an artifact. Ehrlich and others, including Professor Bleile and myself, do not hold this view. It would be strange that such a remarkable variation would occur so uniformly over so long a period. (As was stated in the former article, my observations extended over a period of four months, and the corpuscles were discovered two months before a systematic study was begun.)

4. It is possible that this variation was antecedent to the onset of pernicious anemia or some other blood disease. That would make the deformity none the less remarkable, for there were absolutely no symptoms, at any time, of any incipient illness.

5. So far as the writer has been able to ascertain, this is the first case of the kind recorded. However, Ewald, of Strassburg, writes that he thinks a similar observation was made at Königsberg twenty or thirty years ago. I have not been able to find any written record of such an observation.

MELVIN DRESBACH.

DEPARTMENT OF PHYSIOLOGY,
OHIO STATE UNIVERSITY.

QUOTATIONS.

COMPULSORY GREEK AT CAMBRIDGE.

THE University of Cambridge has declined, by a considerable majority, to make Greek an optional, instead of, as at present, a compulsory, subject in the previous examination. The decision was not unexpected; and probably now the whole question will enter on a new phase. Though sympathizing with the aims of the proposers of the graces, we have already expressed the opinion that it was perhaps a mistake to raise so great a question as the place of Greek in higher education upon the comparatively minor issue of the regulations for a pass examination, in which all that has to be considered is a *minimum* of attainment. This, as Professor Butcher has pointed out, is not the way to estimate the value to the community of any branch of academic learning, be it Greek, mathematics or science. But in the present examination-ridden condition of higher education in England our educational authorities seem unable to think of learning or study except in terms of examination, with the result that, in Professor Butcher's words, when it is desired to modify the existing relation of Greek to university studies, 'a single examination is tinkered, without any regard to its bearings on the university course as a whole.' There has been very little attempt to lay down definite lines of study, and then consider the preliminary examination at entrance in its relation to different curricula. Because the exaction of a *minimum* attainment in Greek is now found to press hardly upon certain students without any corresponding advantage of literary culture, it was proposed at Cambridge to give an unrestricted option to all candidates, with no distinction between students of literature and of science, of different lines of study and of different curricula. The more limited proposal rejected a short time ago by the University of Oxford at least recognized the principle of adjusting the entrance examination to certain lines of academic study; but it was too limited and partial in its scope, and its adoption would have gone but a very little way towards a solution of the problem. What is wanted now in the interests of higher

education generally is not a mere tinkering with responsions or the previous examination, but to lay down by what avenues of study a university degree may be approached and how the various examinations may be adjusted to them. 'Compulsory Greek' is but an incident of this larger question.—The London *Times*.

STUDENTS OF THE GERMAN UNIVERSITIES.

A CONSULAR report states that this winter semester there are in Germany 39,716 matriculated students, against 39,581 during the past summer semester, and 39,718 last winter. At the beginning of the nineties there were in round numbers 29,000 students, and in the winter of 1894–95, 28,105; the third ten thousand was not reached until the winter 1897–98, when the number was 31,110, since which time there has been a steady increase until now, when the fourth ten thousand has been nearly reached. The numbers of those in attendance at the several universities during the winter semester 1894–95, the present winter semester, and the two previous semesters, were as follows:

University.	Winter 1894–95.	Winter 1903–4.	Summer 1904.	Winter 1904–5.
Berlin	5,031	7,503	6,096	7,774
Munich	3,475	4,906	4,946	4,766
Leipzig	2,985	3,772	3,575	3,880
Bonn	1,518	2,294	2,818	2,568
Halle	1,539	1,753	1,780	1,881
Breslau	7,293	1,770	1,800	1,870
Göttingen	804	1,370	1,581	1,574
Freiberg	1,136	1,331	2,029	1,501
Tübingen	1,165	1,387	1,581	1,407
Strassburg	949	1,333	1,299	1,395
Heidelberg	1,028	1,359	1,655	1,371
Würzburg	1,347	1,283	1,322	1,295
Marburg	800	1,154	1,421	1,276
Münster	411	1,204	1,255	1,256
Giessen	528	1,071	1,093	1,069
Jena	635	816	1,024	953
Erlangen	1,131	982	373	942
Königsberg	709	925	1,018	932
Kiel	504	758	1,000	745
Greifswald	750	687	775	705
Rostock	420	519	540	556

The number of students pursuing different subjects was:

	Number of Students.	
	1894–95.	1904–05.
Law	7,380	11,777
Philology and history	3,083	8,322
Medicine	7,768	5,906
Mathematics and science	2,525	5,688
Evangelical theology	3,083	2,136
Catholic theology	1,404	1,678
Pharmacy	1,214	1,387
Agriculture	883	1,055
Forestry	413	1,024
Dentistry	282	596
Veterinary surgery	70	149
Total	28,105	39,718

THE GEOGRAPHICAL AND GEOLOGICAL SURVEY OF SAO PAULO.

THE state of Sao Paulo, Brazil, has since 1886 maintained a Geographical and Geological Survey, the only organization of its kind on the South American continent, which up to the present time has made a detailed topographical map of nearly a third of its territory and made geological contributions that have attracted world-wide attention. Later the government of the same state established an engineering school with the title of Escloa Polytechnica de Sao Paulo that aspires to be, and in many respects is, one of the first of its kind on the continent. A correspondent informs us that about four years ago a group of professors of the newly organized school initiated a campaign to undermine the older organization. The organizer and chief of the survey, Dr. Orville A. Derby, has been forced to resign, being accompanied by the chief topographer, Dr. Horace E. Williams, and by the largest and best part of the topographical staff. A railroad engineer has been appointed to succeed Dr. Derby and the government of the state, while announcing its intention of greatly improving the service, is now wrestling with the problem of mapping its territory without trained topographers.

THE PROGRAM OF STUDIES OF COLUMBIA COLLEGE.

THE trustees of Columbia University have this month adopted a new program of studies for the college on the recommendation of the faculty.

The degree of bachelor of science, as well as that of bachelor of arts, will hereafter be open to students in the college. Candidates for the B.S. degree will not be required to offer any ancient language at entrance or to pursue the study of an ancient language in college, but such students must devote an equivalent time to the study of the natural and physical sciences.

After a student has made 72 points of the 124 required, which he can do in two years, (1) he may take the studies of the first year of the Schools of Applied Science and receive the degree of A.B. or B.S. upon the completion of two years' work; (2) he may take the studies of the first year of the College of Physicians and Surgeons, and receive his A.B. or B.S. upon the completion of two years' work; (3) he may take the studies of the first year of the professional course of Teachers College, and receive his A.B. or B.S. after two years' work; or (4) he may take the studies of the first year in the School of Fine Arts, and receive his A.B. or B.S. after two years' work. When a student has received 94 of the 124 points he may take the studies of the first year of the School of Law; and receive the degree of A.B. or B.S. upon the satisfactory completion of one year's work in this course.

The student who obtains the mark A in any two courses in one half year will be entitled to receive one point of extra credit, provided he has not fallen below the mark B in any of the courses pursued by him during the half year. A student who receives the mark D in two or more courses in any half year is to be given credit for but one of these courses.

Students will be regularly admitted to the freshman class at the beginning of the second half year in February, as well as at the beginning of the first half year in September. The work of one half year may be satisfied by the entrance examinations. Examinations for admission will be held in January of each year. A half year is made the unit for courses.

The first two years are practically prescribed, seven different subjects being required in the freshman year. The prescribed studies are: English, five hours; French or German, three hours; history, three hours; mathematics, three hours; philosophy, three hours; physical education, two hours; science, three hours; and either Latin or an additional course in science, three hours, according as the student is a candidate for the A.B. or B.S. degree. The courses of the last two years are elective, and as indicated above, the courses of the professional schools may be elected.

SCIENTIFIC NOTES AND NEWS.

A GRANT of $150,000 has been authorized by the Carnegie Institution for the Solar Observatory on Mt. Wilson, and it is expected that the first equipment will cost about twice this sum. The present staff of the observatory is: George E. Hale, director; G. W. Richey, astronomer and superintendent of instrument construction; Ferdinand Ellerman, assistant astronomer, and Walter S. Adams, assistant astronomer. The address of Messrs. Hale and Ritchey is Pasadena, and the address of Messrs. Allerman and Adams is Mt. Wilson. Professor Barnard is also at work temporarily on Mt. Wilson with the Bruce photographic telescope of the Yerkes Observatory.

PROFESSOR F. L. O. WADSWORTH has resigned his position as director of the Allegheny Observatory because of the lack of funds required to properly carry on the work of that institution. For this reason all work has been suspended at the observatory for more than a year, except that of taking routine time observations. Professor Wadsworth has been appointed general manager of the Pressed Prism Plate Glass Company and is now at Morgantown, W. Va.

SENHOR MANUEL GARCIA celebrated his hundredth birthday on March 7 in excellent health. He gave the first performance of Italian opera in New York City in 1825, and was long celebrated as a teacher of singing. His important contribution to science was the invention of the laryngoscope fifty years ago. Senhor Garcia was presented with a portrait of himself by Mr. John S. Sargent and received a number of congratulatory addresses with decorations from King Edward, Emperor William and the King of Spain.

The University of Glasgow will confer its doctorate of laws on Dr. Alexander Crum Brown, professor of chemistry at Edinburgh.

Professor W. H. Burr, of Columbia University, has been appointed consulting engineer of the New York City aqueduct commission with a salary of $6,000.

Professor W. T. Sedgwick, of the Massachusetts Institute of Technology, has gone to Europe on leave for six months. His European address is in care of Messrs. Baring Bros., Limited, 8 Bishopsgate St., London, E. C.

Dr. W. J. Holland, the director of the Carnegie Museum, sailed for England on March 18. He repairs to London to install the reproduction of the great skeleton of Diplodocus which he has made from the original in the Carnegie Museum. It will be placed in the gallery of reptiles at the British Museum. Mr. Carnegie will formally present the restoration, which has been made at his expense, to the trustees of the British Museum some time in May. The total length of the vertebral column, including the skull, is eighty-four feet, exceeding the dinosaur Brontosaurus in the American Museum of Natural History by nearly twenty feet. Dr. Holland is accompanied by Mr. A. S. Coggeshall, the chief preparator in the section of paleontology in the Carnegie Museum.

Professor E. A. Minchin, Jodrell professor of zoology in University College, London, has undertaken to conduct further investigations, under the auspices of the Royal Society's committee, into the causation of sleeping sickness in the Uganda Protectorate.

Under the auspices of the department of economics of Harvard University Professor W. F. Willcox, of Cornell University, who acted as expert in charge of methods and results in the United States census of 1900, will give three public lectures during the last week of the month on some phases of the census investigations. The subjects will be: 'The Population of the United States,' 'Some Statistical Aspects of the Negro Problem' and 'The Birth Rate and Death Rate of the United States.' The exact hours and place will be announced later.

Professor David Eugene Smith, of Teachers College, Columbia University, has recently purchased the library of Professor Ferinando Jacoli, of Venice, and has added it to his own collection for the use of his students. The library is particularly rich in the history and teaching of mathematics, containing many rare editions. Professor Smith has at the same time made available for study his rare collection of portraits and manuscripts of celebrated mathematicians, the largest that has been brought together.

The Board of Estimate of New York City has appropriated $5,000 to estimate the epidemic of cerebro-spinal meningitis. A commission has been named for this purpose as follows: Dr. William M. Polk, chairman, dean of Cornell Medical College; Dr. Walter B. James, professor in the College of Physicians and Surgeons; Dr. William P. Northrup, professor in Bellevue Hospital and at New York University; Dr. Simon Flexner, head of the Rockefeller Institute; Dr. Joshua M. Van Cott, pathologist at the Long Island College; Dr. E. K. Dunham, pathologist of Carnegie Laboratory, and Dr. William K. Draper, visiting physician at Bellevue and Minturn Hospitals.

The first Herbert Spencer lecture, established by Pandit Shyamáji Krishnavarma, M.A., of Balliol College, was given at Oxford, on March 9, by Mr. Frederic Harrison, M.A., honorary fellow of Wadham College.

We regret to record the deaths of Dr. Hjalmar Stolpe, the ethnologist of Stockholm; of Dr. Ludwig von Tetmajer, professor of mechanics in the Technical Institute of Dresden, and of M. Emile Fernet, a French physicist, for many years editor of the *Comptes Rendus* of the Academy of Sciences.

The position of assistant in the clinical laboratory of the New York State Pathological Institute will be filled by civil service examination on April 8. The salary is $1,500.

The second section of the museum building, near the Prospect Park Plaza, Brooklyn, has been completed and provided with cases and furniture at an expense to the city of New York of upwards of $600,000. It is expected

that this section of the museum will be turned over by the city to the Brooklyn Institute of Arts and Sciences very soon.

THE French government has proposed to the chamber of deputies to create a Universal Exposition in Paris in 1920 to commemorate the foundation of the French republic.

THE daily papers state that the Duke of Orleans is preparing an Arctic expedition, and has offered to purchase the *Fram* of the Nansen expedition. The Norwegian government has, however, declined to sell it.

IN order to avoid clashing with the International Tuberculosis Congress, which is to be held this year in Paris from October 2 to 7, the organizing committee of the French Congress of Medicine has decided to change the date of meeting from October 2, 3 and 4, to September 25, 26 and 27.

IT is said that United States food laboratories will be established in Boston, Orleans and San Francisco similar to the one recently opened in New York City.

A METEOROLOGICAL observatory in the Transvaal has been established near Johannesburg, with Mr. R. T. A. Innes as director.

THE Lake Laboratory of the Ohio State University announces for its summer work in biology at the Cedar Point Laboratory, near Sandusky, courses of instruction in general zoology and botany and advanced courses in comparative anatomy, embryology, entomology, ichthyology, ornithology, experimental zoology, ecology and special work in botany. The staff includes, besides the director, Professor F. L. Landacre, of the Ohio State University; Dr. W. E. Kellicott, Barnard College, Columbia University; Professor L. B. Walton, Kenyon College, and Mr. O. E. Jennings, curator of botany at the Carnegie Museum, Pittsburg. The course in experimental zoology, under the charge of Dr. Kellicott, of Columbia University, is a new feature in the work. As heretofore special attention will be given to the opportunities for investigators, those doing independent work being allowed free use of the laboratory with the expectation that each will furnish his own microscope and other apparatus or materials used in his investigation. The instruction courses open on June 26 and close on August 4, and the laboratory will be open for investigators from June 26 to September 15. Detailed information may be obtained by addressing the director, Professor Herbert Osborn, Ohio State University, Columbus, Ohio.

THE London *Times* states that the French Ministry of Public Works has commissioned M. Jacquier to project plans for a railway between Chamonix and Aosta. He considers the difficulty would not be so great as with the Simplon tunnel; the tunnel would be 4½ miles shorter, and the rock gives no indication of subterranean reservoirs of water. The tunnel would commence at Chamonix, 3,415 feet above sea level, and end at Entrèves (4,550 feet), a distance of 8½ miles. The Dora Baltea would give ample water power for the boring work, and afterwards for locomotion.

ACCORDING to foreign exchanges, the Danish government has begun a survey of Iceland. Much of Iceland has never been accurately surveyed, triangulation having been carried out in only a few parts of the island. The least known region is the southern coast, which is impassable in summer owing to the quicksands, and also the inland ice-masses of the Vatna Jökull, and it is here that a beginning has been made with the survey. During the summer of 1903 a plan of the survey was laid down by means of a preliminary expedition, and in the spring of 1904, so long as the frosts made it possible to cross the morasses and streams, a part of the southern region in the district of Skeideraasande was surveyed. A second survey party was detailed to study the inland ice. One result of the work was to show that the highest point of the island is Hvannadalshnukr, which is 2,120 meters, and not, as has been hitherto supposed, the Oraefa Jökull, which is only 1,959 meters. In all about 100 Danish square miles, that is 5,700 square kilometers, have been already surveyed.

REUTER'S AGENCY is informed that Mr. A. E. Pratt, who lately returned to England from a two years' expedition in the remote interior of British New Guinea, chiefly along the Owen Stanley Range, has sailed on a new scientific

expedition, which is expected to last for two and a half years. Mr. Pratt, accompanied by his two sons, proceeds direct to Batavia, where he will make final arrangements for his journey. After conferring with the Dutch government officials he will cross to Dobo, the chief town of the Aru Islands, a group unknown to Europeans. After making collections there the expedition will cross to Dutch New Guinea and will immediately strike into the interior with the object of reaching the highest possible point of the Charles Louis Range, a snow region running east and west of Dutch New Guinea never before explored. Valuable geographical results are expected, and a map will be made, but the special work of the expedition will be the collecting of natural history specimens.

The council of the Royal Meteorological Society arranged to hold an exhibition of meteorological instruments from March 14 to 17. The exhibition was chiefly devoted to recording instruments; but it also included new meteorological apparatus invented or first constructed since the society's last exhibition, as well as photographs, drawings and other objects possessing meteorological interest.

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The will of Mrs. Jane Lathrop Stanford gives about $3,000,000 to relatives, and about $100,000 to charities. The residue of the estate, which it is said will amount to about $2,000,000, is bequeathed to Leland Stanford Junior University. The university also comes into possession of the house built by Senator Stanford at San Francisco and its contents, which are valued at more than $2,000,000.

It is now said that Sir William MacDonald, of Montreal, has decided to give $4,000,000 to the cause of education and has unfolded his scheme in detail. It consists of the erection of a normal school at St. Anne de Bellevue, a few miles distant from Montreal, and the erection and endowment of an agricultural college at the same place, to the plans for which we have already called attention.

The legislature of North Carolina, which adjourned on March 7, appropriated $50,000 for the erection of a chemical laboratory at the University of North Carolina. The plans for this laboratory have been accepted and work will begin at once.

The Boys' Central High School of Philadelphia was injured by fire to the extent of $100,000 on March 9. The equipment of the astronomical department suffered especially, the loss there being estimated at $30,000, in addition to books and manuscripts belonging to Professor Monroe B. Snyder.

Mr. Shyamáji Krishnavarma has offered to establish six traveling fellowships at Oxford, five of them to be called the Herbert Spencer Indian fellowships. The fellowships are intended for natives of India.

Mr. Edward Whitley, B.A. Trinity College, has given £1,000 towards the permanent endowment of the chair of physiology in the University of Oxford.

At St. Petersburg, Moscow, Kieff, Kharkoff, Kazan and other large towns having universities or technical colleges, these institutions have been closed by order of the authorities.

Meetings are being held between the medical faculties of McGill University and the Bishop's College University, Montreal, looking toward the amalgamation of Bishop's medical faculty with that of McGill University.

The Thaw fellowship in astronomy at Princeton University is open for the coming academic year to college graduates of not more than five years' standing. The income of the fellowship is five hundred dollars a year; the holder is expected to devote his entire time to graduate work and research, and will be eligible to reelection. Applications with credentials should be received by the dean of the graduate school before the first of May.

Dr. R. S. Woodworth, instructor in psychology in Columbia University, has been promoted to an adjunct professorship.

Mr. James C. Irvine, Ph.D., D.Sc., has been appointed to the new lectureship in organic chemistry in St. Andrews University.

Dr. Paul Drude, of Giessen, has accepted a call to a professorship of physics at Berlin.